

williamsaunders

architecture : engineering : building consultancy



PROPOSED RESIDENTIAL DEVELOPMENT

SMALL DROVE, WESTON

DRAINAGE STRATEGY

11505/12 REV A

DECEMBER 2016

Contract: Residential Development, Small Drove, Weston**Document Title:** Drainage Strategy**Our Ref:** CM/KW/11505/12.0**Prepared by:** C. Melton EngTech MICE MCIHT MIHE **Date:** December 2016**RECORD OF AMENDMENTS TO DOCUMENT**

Ref	Description	Date
Rev A	Site layout updated, drainage layout updated, flood data in report updated.	20/04/2018

Verified by: A.C. Gibson BEng CEng MICE MCIHT **Date:** December 2016

C O N T E N T S

1.0	INTRODUCTION
2.0	PROPOSED DEVELOPMENT
3.0	DRAINAGE STRATEGY
4.0	CONCLUSIONS

APPENDICES

Appendix A	Permeability Testing Results
Appendix B	Proposed Site Layout
Appendix C	Calculations
Appendix D	Anglian Water Pre-Planning Enquiry
Appendix E	Proposed Drainage Layout

SMALL DROVE, WESTON

DRAINAGE STRATEGY

1.0 INTRODUCTION

William Saunders have been commissioned by Welland Homes to prepare a Drainage Strategy for the proposed residential development at Small Drove, Weston. The document is to support a planning application for the development.

2.0 PROPOSED DEVELOPMENT

2.1 SITE LOCATION AND DESCRIPTION

The development site is located off Small Drive, Weston near Spalding. Its National Grid Reference is 529272 / 324829 (see figure 1 below).



Figure 1 – Location Plan from SKDC.

The existing site comprises 10 no bungalows, with surrounding garden areas. Pedestrian and vehicular access to the site access is available directly from Small Drive. The site has an area of approximately 8400m² / 0.84ha.

The proposed development is located in an area identified by the EA at risk of flooding from fluvial, tidal or any natural or artificial water bodies, and the site is within Flood Zone 3.

SMALL DROVE, WESTON

DRAINAGE STRATEGY

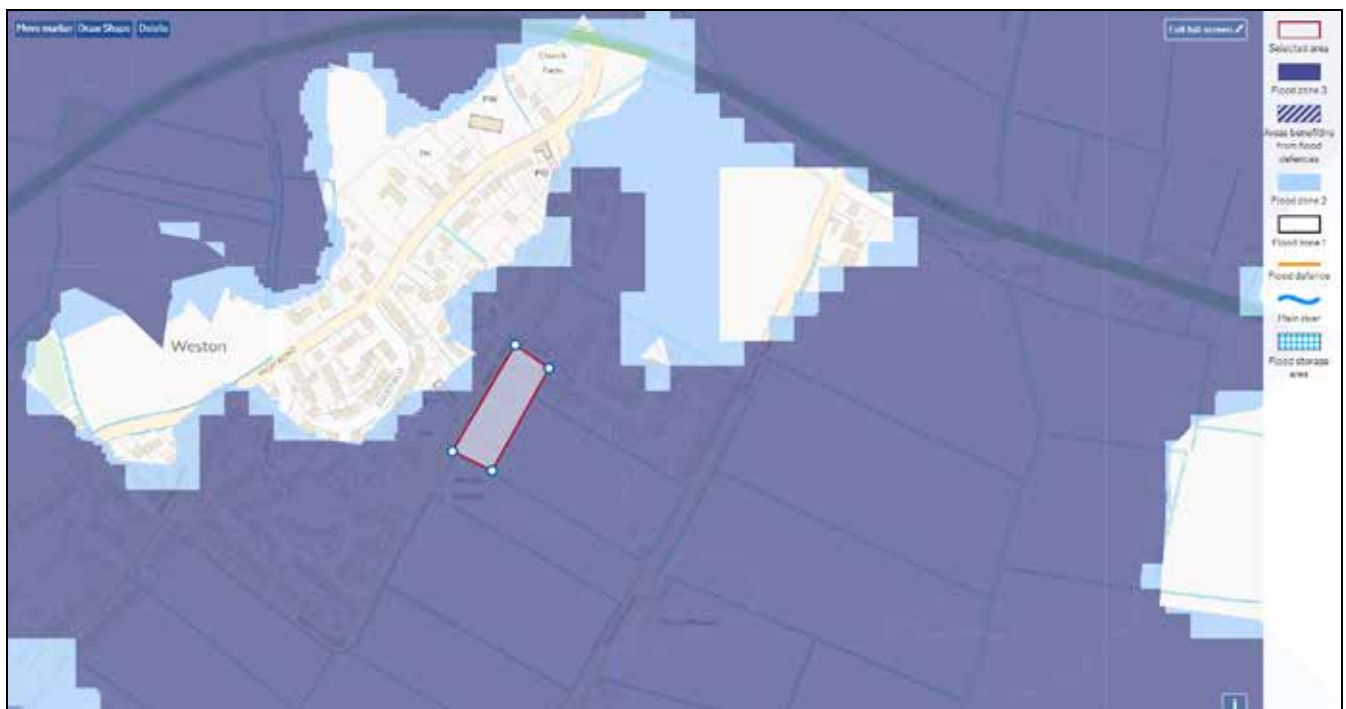


Figure 2 – Gov.uk / Environment Agency Flood Map for Planning



Figure 3 – Gov.uk / Environment Agency Surface Water Flood Map

2.2 DEVELOPMENT PROPOSALS

It is proposed to develop the site with 35no. residential units with highway access coming from Small Drove. An indicative site layout is shown at Appendix C.

3.0 DRAINAGE STRATEGY

3.1 FOUL DRAINAGE

The Pre-Development Enquiry confirms the discharge locations and that there is sufficient capacity within the network. Anglian Water records indicate there are a number of 150mm foul sewers located to the west and east of the site with one running through the site. The existing manholes of these sewers could be used for connection points. Existing Anglian Water foul sewers will require a 3.0m easement either side of the centre line of the sewer.

3.2 SURFACE WATER DRAINAGE

In accordance with requirement H3 of the Building Regulations 2000 all possible options for disposal of surface water have been considered using the preferred hierarchy i.e.

- Soakaways
- Infiltration
- Watercourse
- Sewer

Based on the results of Permeability Testing carried out on the site on the 24th November 2016 by Solmek, the ground conditions are considered suitable for infiltration. The Permeability Testing results can be found in Appendix B. During the permeability testing an existing soakaway was located which indicates that the existing buildings are drained via soakaways.

Soakaways should be located 5 metres away from any building and the Highway. It is proposed to use permeable paving for the access road and parking areas. Roof water is to be discharged to the ground via infiltration.

3.3 PRELIMINARY SOAKAWAY SIZING

Taking the worst-case infiltration result from the permeability testing, 2.22E-06, and a typical roof size of 90sqm for a semi-detached property. A trench soakaway at 1.0m in width will need to be 10.15m x 1.0m deep.

3.4 DRAINAGE STRATEGY

In order to reduce the run off from the developed site and accommodate future climate change, the detailed design of the surface water drainage system will need to include the following: -

- Sustainable Drainage Systems
 - Drainage elements such as water butts, permeable paving etc. to ensure reduction of volume and rate of run off and improvement of water quality prior to discharge.
- Attenuation
 - Attenuation will not be required as the surface water runoff from roof areas will be directed to soakaways located in the garden areas of the buildings. Hard paved areas will consist of permeable paving.
- Flood Flow Routes
 - To address the residual risks of surface water flows and potential infrastructure failure, flow routes for such waters should be analysed and demonstrated to not present a hazard to the development or adjacent properties.
- Plot Level
 - The flood risk assessment states that the finished floor levels should be set to 300mm or 600mm above the existing ground level depending on the position within the site to mitigate the risk from surface water flooding.

Detailed discussions with the adopting authority for both highways and sewers will be necessary to address potentially conflicting requirements, and designs should be in accordance with “Sewers for Adoption” and the “National Standards for Sustainable Drainage Systems” to ensure adoption requirements are met.

4.0 CONCLUSIONS

- The proposed development is within Flood Zone 3 and is at risk of from a combination of fluvial and tidal flooding, as such a Flood Risk Assessment will need to be carried out.
- Ground conditions are favourable for surface water to be discharged through infiltration.
- The surface water runoff generated by the proposed development will be managed in a manner which will ensure no risk of flooding or increased risk to surrounding properties, at present and taking into account allowances for future climate change.
- The residual risks from surface water and infrastructure failure will be addressed by consideration of flood flow routes through the development.
- There are existing 150mm diameter foul sewers crossing the site which will be subject to a 3.0m easement from the centre line of the sewer.
- Soakaways should be located at least 5.0m away from buildings and the Highway. Adoptable permeable paving will need to be agreed with the Highway Authority.
- Soakaways should be sited above the water table, which will need to be determined by further site investigation.

SMALL DROVE, WESTON

DRAINAGE STATEMENT

APPENDIX A

Permeability Testing Results

Site Investigations



Geologists



Environmental &
Geotechnical
Engineers



Solmek Ltd.

12 Yarm Road
Stockton on Tees
TS18 3NA
www.solmek.com

Tel: 01642 607083

Fax: 01642 612355

E-mail: south@solmek.com

FAO Alex Gibson

Date: 29th November 2016

William Saunders
Sheppard Lockton House
Cafferata Way
Newark
Nottinghamshire
NG24 2TN

Permeability Testing

**Small Drove, Weston
S161131**

Dear Alex,

Solmek visited the above site on 24th November 2016 to carry out a series of percolation tests within four hand dug trial pits to a maximum depth of 0.80mbgl as instructed by the client. Water was then added to the trial pits from a water bowser. During the excavation of Trial Pit 2 (TP2) gravel was encountered from 0.55mbgl to 0.80mbgl which, given the high infiltration rate, could potentially be a soakaway for the existing housing development on site.

Please find attached the details of the percolation tests. The testing was carried out in accordance with BRE Digest 365: Soakaway Design.

Below gives a summary of the related infiltrations rates for each trial pit.

Test Number	Infiltration Rate (m/sec x10 ⁻⁶)	Description of Base stratum
TP1	2.22	Brown sandy clayey SILT
TP2	3370	Rounded fine to coarse GRAVEL
TP3	10.2	Brown very sandy clayey SILT
TP4	38.0	Brown very sandy clayey SILT

We would like to take this opportunity to thank you for using Solmek.

**Yours sincerely
On behalf of Solmek Ltd**

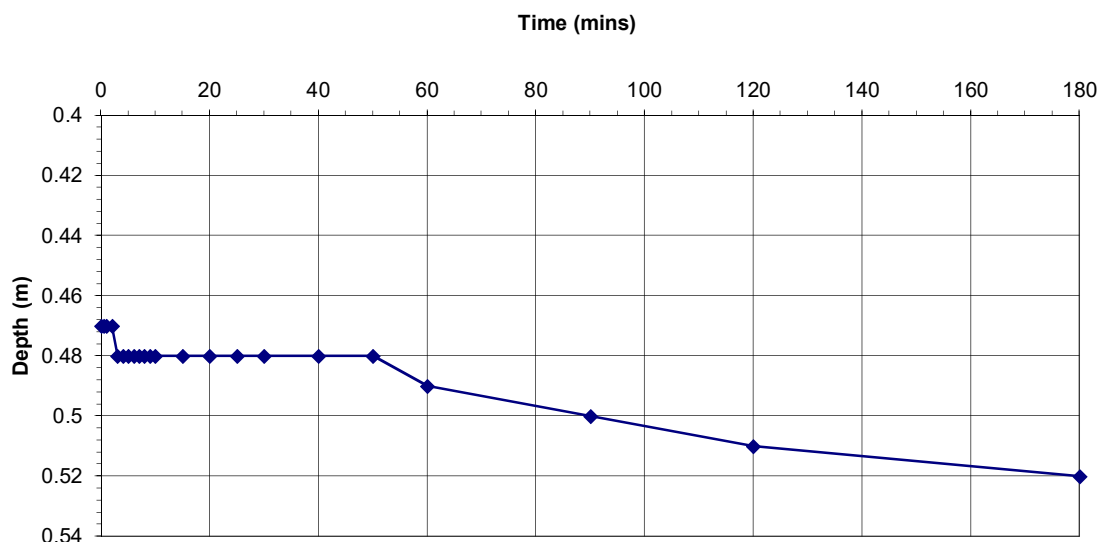
**S Alexander
Engineering Geologist**

SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	William Saunders			
Site:	Small Drove, Weston			
Job No:	S161131			
Pit No:	TP1	Test No:	1	

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (m)	Pit Dimensions	Length (m) =	0.60
0	0.47		Width (m) =	0.45
0.5	0.47		Depth (m) =	0.75
1	0.47			
2	0.47	Depth at start of test (m) =		0.470
3	0.48	Depth at end of test (m) =		0.520
4	0.48	75% level (m) =		0.483
5	0.48	50% Effective Depth		0.255
6	0.48	25% level (m) =		0.508
7	0.48			
8	0.48	Base area of pit (m ²) =		0.270
9	0.48	V _{p75-25} (m ³) =		0.007
10	0.48	a _{0.50} (m ²) =		0.806
15	0.48			
20	0.48	From the graph:		
25	0.48	tp 75 (min) =		52
30	0.48	tp 25 (min) =		115
40	0.48			
50	0.48	Soil infiltration rate, f, (m/s) =		2.22E-06 normal test
60	0.49			
90	0.5			
120	0.51	Input by:	SA	Date: 29/11/2016
180	0.52	Checked by:	RW	Date: 29/11/2016

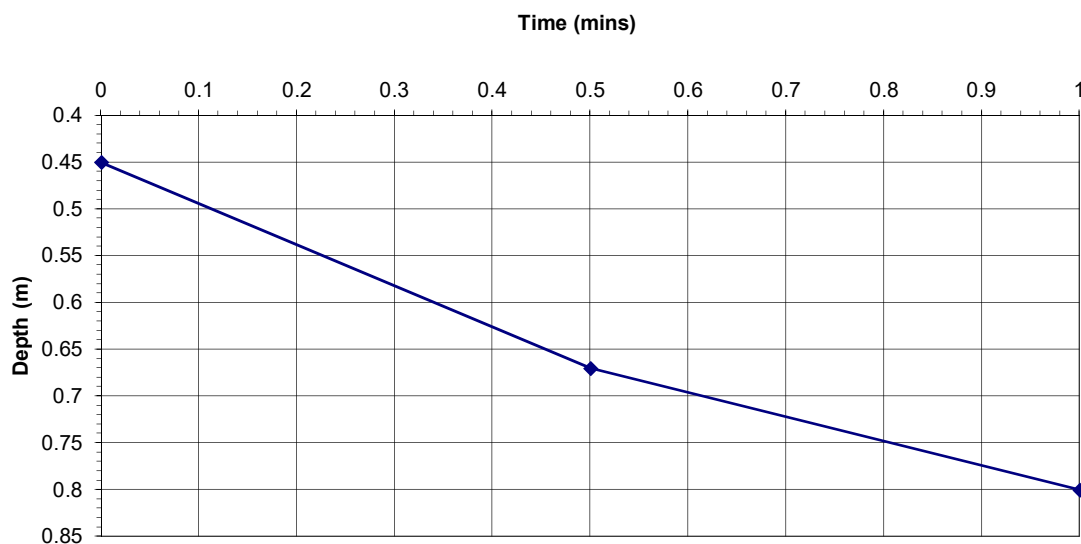


SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	William Saunders			
Site:	Small Drove, Weston			
Job No:	S161131			
Pit No:	TP2	Test No:	1	

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (m)		Pit Dimensions	Length (m) =	0.70
0	0.45			Width (m) =	0.55
0.5	0.67			Depth (m) =	0.80
1	0.8				
2		Depth at start of test (m) =			0.450
3		Depth at end of test (m)=			0.800
4		75% level (m)=			0.538
5		50% Effective Depth			0.175
6		25% level (m)=			0.713
7					
8		Base area of pit (m ²) =			0.385
9		V _{p75-25} (m ³) =			0.067
10		a _{p50} (m ²) =			0.823
15					
20			From the graph:		
25			tp 75 (min) =	0.31	
30			tp 25 (min) =	0.715	
40					
50		Soil infiltration rate, f, (m/s) =		3.37E-03	normal test
60					
90					
120		Input by:	SA	Date:	29/11/2016
180		Checked by:	RW	Date:	29/11/2016

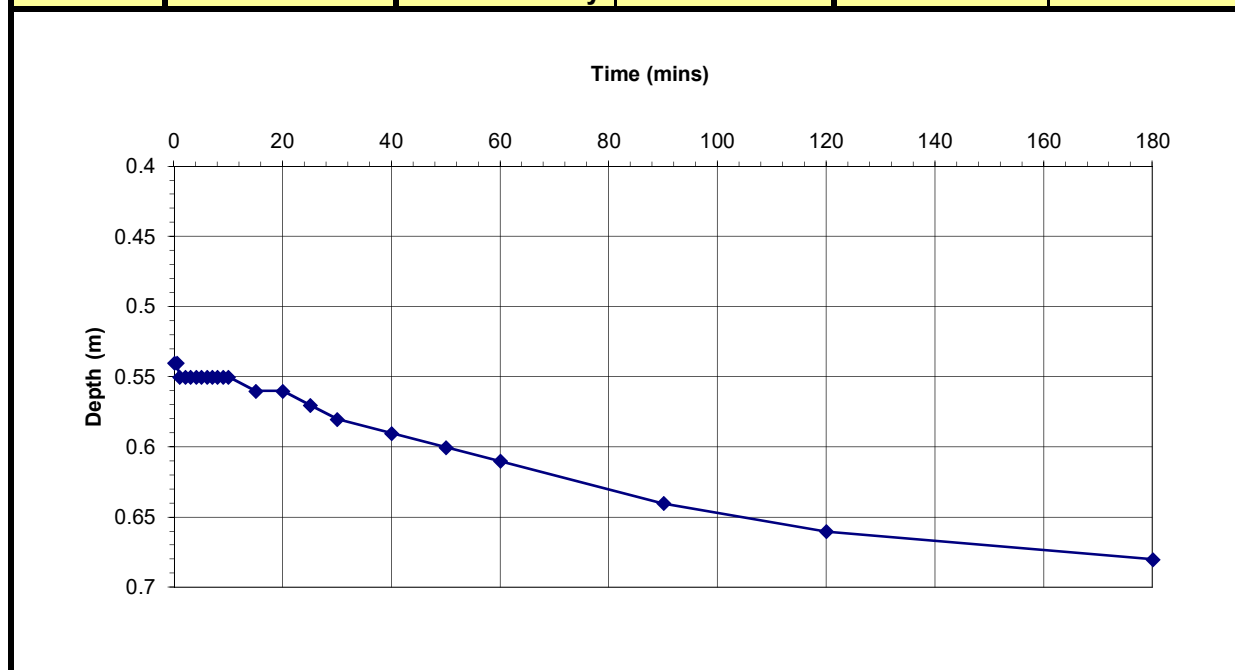


SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	William Saunders			
Site:	Small Drove, Weston			
Job No:	S161131			
Pit No:	TP3	Test No:	1	

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (m)	Pit Dimensions	Length (m) =	0.60
0	0.54		Width (m) =	0.45
0.5	0.54		Depth (m) =	0.70
1	0.55			
2	0.55	Depth at start of test (m) =		0.540
3	0.55	Depth at end of test (m) =		0.680
4	0.55	75% level (m) =		0.575
5	0.55	50% Effective Depth		0.090
6	0.55	25% level (m) =		0.645
7	0.55			
8	0.55	Base area of pit (m ²) =		0.270
9	0.55	V _{p75-25} (m ³) =		0.019
10	0.55	a _{0.50} (m ²) =		0.459
15	0.56			
20	0.56	From the graph:		
25	0.57	tp 75 (min) =		27.5
30	0.58	tp 25 (min) =		95
40	0.59			
50	0.6	Soil infiltration rate, f, (m/s) =	1.02E-05	normal test
60	0.61			
90	0.64			
120	0.66	Input by:	SA	Date: 29/11/2016
180	0.68	Checked by:	RW	Date: 29/11/2016

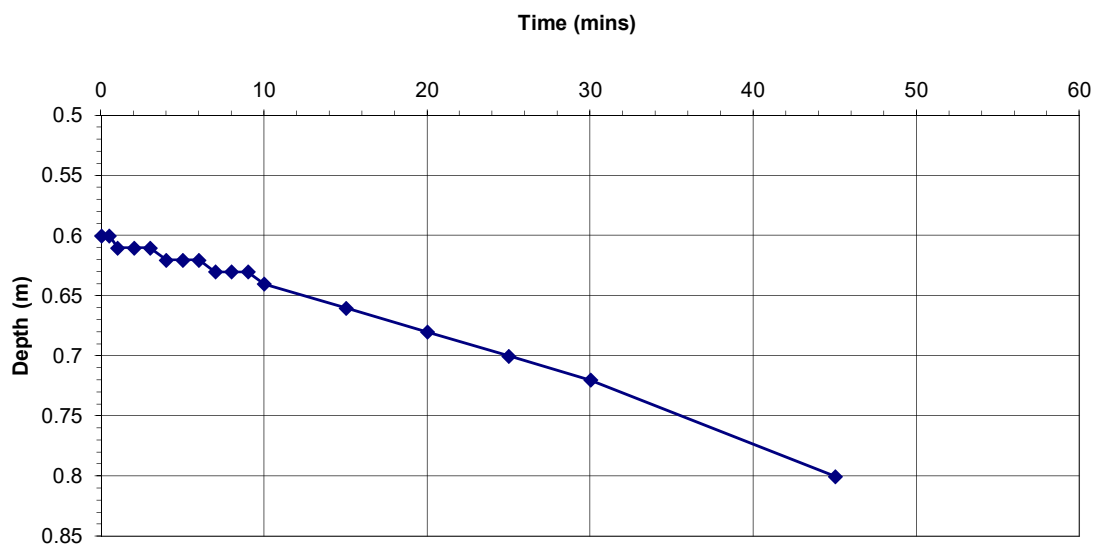


SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	William Saunders			
Site:	Small Drove, Weston			
Job No:	S161131			
Pit No:	TP4	Test No:	1	

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (m)	Pit Dimensions	Length (m) =	0.65
0	0.6		Width (m) =	0.45
0.5	0.6		Depth (m) =	0.80
1	0.61			
2	0.61	Depth at start of test (m) =		0.600
3	0.61	Depth at end of test (m) =		0.800
4	0.62	75% level (m) =		0.650
5	0.62	50% Effective Depth		0.100
6	0.62	25% level (m) =		0.750
7	0.63			
8	0.63	Base area of pit (m ²) =		0.293
9	0.63	V _{p75-25} (m ³) =		0.029
10	0.64	a _{0.50} (m ²) =		0.513
15	0.66			
20	0.68	From the graph:		
25	0.7	tp 75 (min) =		12.5
30	0.72	tp 25 (min) =		37.5
45	0.8			
50		Soil infiltration rate, f, (m/s) =		3.80E-05 normal test
60				
90				
120		Input by:	SA	Date: 29/11/2016
180		Checked by:	RW	Date: 29/11/2016



▲Solmek conditions of offer, notes on limitations & basis for contract (ref: version1/2016)

These conditions accompany our tender and supercede any previous conditions issued. Solmek will prepare a report solely for the use of the Client (the party invoiced) and its agent(s). No reliance should be placed on the contents of this report, in whole or in part by 3rd parties. The report, its content and format and associated data are copyright, and the property of Solmek. Photocopying of part or all of the contents, transfer or reproduction of any kind is forbidden without written permission from Solmek. A charge may be levied against such approval, the same to be made at the discretion of Solmek. Solmek was a trading name of Hymas Geoenvironmental Ltd.

Solmek cannot be held liable and do not warrant, or otherwise guarantee the validity of information provided by third parties and subsequently used in our reports. Solmek are not responsible for the action negligent of otherwise of subcontractors or third parties.

Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, ground gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Solmek cannot be held liable for any unrecorded or unforeseen obstructions between exploratory boreholes and trial pits. This includes instances where previous structures on the site (buried man made structures) or the presence of boulder clay (cobbles and/or boulder obstructions) have been anticipated. All types of piling operations should make allowance for obstructions within the construction budget to accommodate this. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

Where the scope of the investigation is limited via access to information, time constraints, equipment limitations, testing, interpretation or by the client or his agents budgetary constraints, elements not set out in the proposal and excluded from the report are deemed to be omitted from the scope of the investigation.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2001 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

Where the type, number or/and depth of exploratory hole is specified by others, Solmek cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

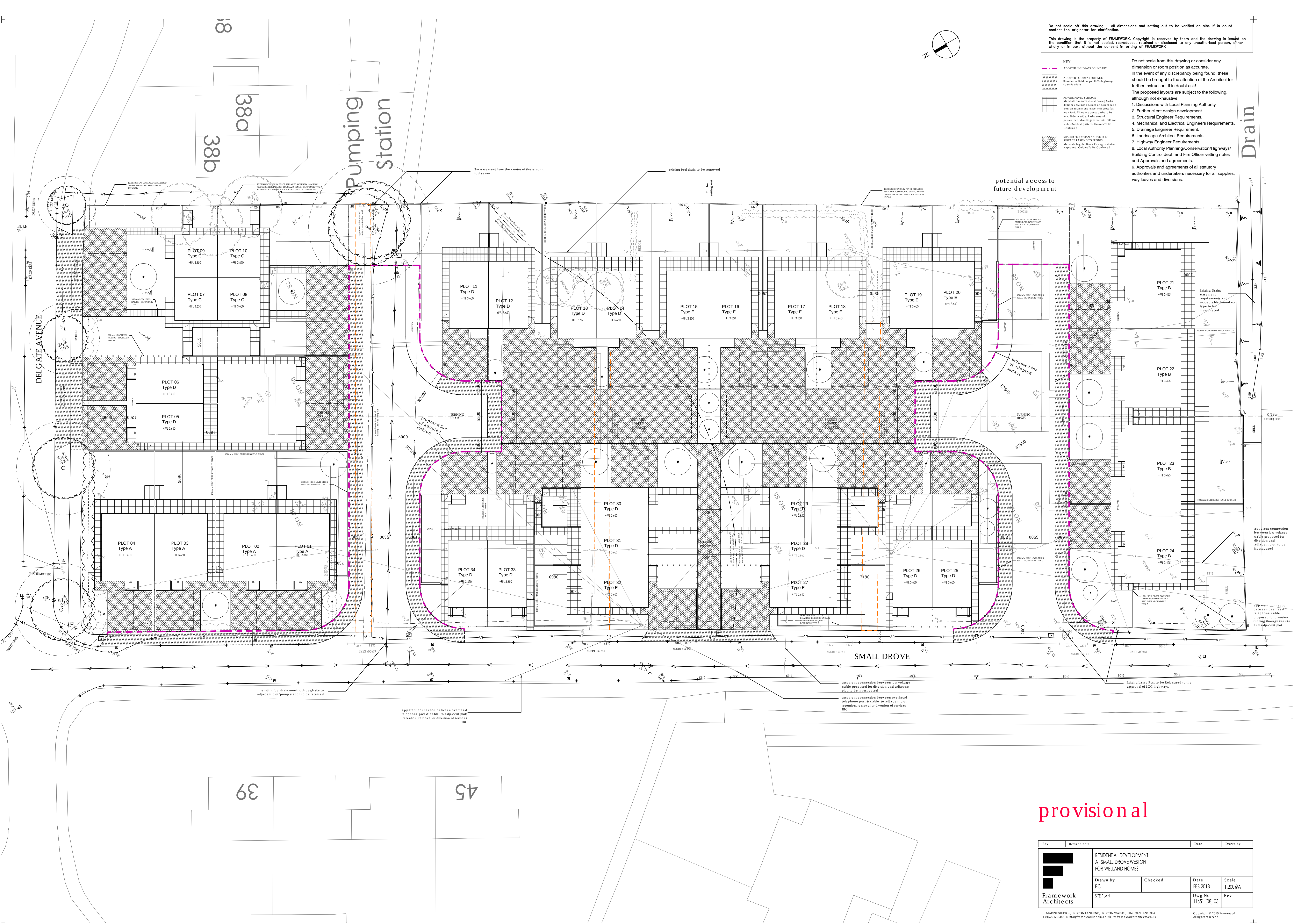
All information acquired by Solmek in the course of investigation is the property of Solmek, and, only also becomes the joint property of the Client only on the complete settlement of all invoices relating to the project. Solmek reserve the right to use the information in commercial tendering and marketing, unless the Client expressly wishes otherwise in writing. The quoted rates do not include VAT, and payment terms are 30 days from dispatch of invoice from our offices. Quotes are subject to a site visit.

We have allowed for 1 mobilisation and normal working hours unless otherwise stated. The scope of the investigation may be reviewed following the desk study and/or fieldwork. The presence or otherwise of Japanese Knotweed or other invasive plants can be difficult to identify especially during winter months. If Japanese Knotweed or other invasive species are suspect, it should be confirmed by an ecologist. We have not allowed for acquiring services information, and cannot be responsible for damage to underground services or pipes not shown to us or not clearly shown on plans. Costs incurred will be passed on to you, and in commissioning Solmek you understand and accept that you/your agent have a contractual relationship with Solmek & you accept this. Our rates assume unobstructed, reasonably level and firm access to the exploratory positions and adequate clear working areas and headroom. We have priced on the basis that you or your client have the necessary permissions, wayleaves and approvals to access land. All boreholes and pits are backfilled with arisings except where gas monitoring pipes are installed with stopcock covers. Solmek are not responsible for any uneven surfaces as a result of siteworks and rutting and backfilled excavations may require re-levelling and/or making good by others after fieldwork is complete, and Solmek has not allowed for this. No price has been provided or requested for a return visit to remove pipework and covers. Hourly rates apply to consultancy only and do not include expenses unless otherwise shown. If warranties are required, legal costs incurred will be passed on to you assuming Solmek agree to complete such warranties, modified or otherwise and you understand and agree to pay all costs.

We reserve the right to pursue full payment of the invoice prior to release of any information including reports. We advise you/your client that we may elect to pursue our statutory rights under late payment legislation, and will apply 8% to the base rate for unreasonably late payments. Solmek are exempt from the CIS Scheme. Solmek offer to undertake work only in strict accordance with conditions covered by our current insurances, which are available for inspection. Solmek are not responsible for acts, negligent or otherwise of subcontractors and as a matter of policy cannot indemnify any other parties. Professional indemnity Insurance is limited to ten times the invoice net total except where stated otherwise by Solmek. Solmek give notice that consequential loss as a direct or indirect result of Solmek's activities or omission of the same are excluded.

APPENDIX B

Preliminary Site Layout



Do not scale off this drawing – All dimensions and setting out to be verified on site. If in doubt contact the originator for clarification.

This drawing is the property of FRAMEWORK. Copyright is reserved by them and the drawing is issued on the condition that it is not copied, reproduced, related or disclosed to any unauthorised person, either wholly or in part without the consent in writing of FRAMEWORK.

- KEY**
- ADOPTED HIGHWAYS BOUNDARY
 - ADOPTED FOOTWAY SURFACE
Bituminous finish as per LIC's highways type B2 zone
 - PRIVATE PAVED SURFACE
Manhalla Saxon Textured Paving Slabs
Griffin + Griffin's System or Slabs used
bed on 150mm sub-base with cross fall
max 1:40. All new access paths to be
min. 300mm wide. Paths covered
parameter of drawings to be min. 900mm
wide. Standard pattern. Cusum to be
Confirmed
 - SHARED PEDESTRIAN AND VEHICLE
SURFACE PAVING TO FROST
Manhalla Tegular Block Paving or similar
approved. Cusum to be Confirmed

Do not scale from this drawing or consider any dimension or room position as accurate. In the event of any discrepancy being found, these should be brought to the attention of the Architect for further instruction. If in doubt ask!

The proposed layouts are subject to the following, although not exhaustive:

1. Discussions with Local Planning Authority
2. Further client design development
3. Structural Engineer Requirements.
4. Mechanical and Electrical Engineers Requirements.
5. Drainage Engineer Requirement.
6. Landscape Architect Requirements.
7. Highway Engineer Requirements.
8. Local Authority Planning/Conservation/Highways/ Building Control dept. and Fire Officer vetting notes and Approvals and agreements.
9. Approvals and agreements of all statutory authorities and undertakers necessary for all supplies, way leaves and diversions.

Drain

Rev	Revision note	Date	Drawn by
1	RESIDENTIAL DEVELOPMENT AT SMALL DROVE WESTON FOR WELLAND HOMES		
2	Drawn by PC	Checked	Date FEB 2018
3	SITE PLAN	Dwg No J1651 (08) 03	Scale 1:2008A1
			Rev

APPENDIX C

Calculations

Results from design calculations for trench soakaway

Small Drove, Weston : 82.37m²

Total excavated depth of soakaway : 2.00 m

Ground level to invert of inflow pipe : 1.00 m

Impermeable surface area (A) : 82.37 m²

Soil infiltration rate (f) : 2.22E-06 m/s

Rainfall ratio : 0.4

Aggregate void : 35%

Soakaway width 1.0 m	
Storm duration (min)	Soakaway length (m)
5	2.10
10	3.05
15	3.70
30	4.65
60	5.70
120	6.70
240	7.60
360	8.00
<u>600</u>	<u>8.20</u>
1440	7.90

NOTE: Critical storm durations are underlined

Total excavated volume = 16.40 m³

Volume of granular fill required = 8.20m³

Emptying time to 50% storage = 19.5 hours

Calculations are in accordance with BRE Digest 365

Results from design calculations for trench soakaway

Small Drove, Weston : 92.68m²

Total excavated depth of soakaway : 2.00 m

Ground level to invert of inflow pipe : 1.00 m

Impermeable surface area (A) : 92.68 m²

Soil infiltration rate (f) : 2.22E-06 m/s

Rainfall ratio : 0.4

Aggregate void : 35%

Soakaway width 1.0 m	
Storm duration (min)	Soakaway length (m)
5	2.40
10	3.40
15	4.15
30	5.25
60	6.40
120	7.55
240	8.55
360	9.00
<u>600</u>	<u>9.25</u>
1440	8.95

NOTE: Critical storm durations are underlined

Total excavated volume = 18.50 m³

Volume of granular fill required = 9.25m³

Emptying time to 50% storage = 19.8 hours

Calculations are in accordance with BRE Digest 365

Results from design calculations for trench soakaway

Small Drove, Weston : 99.82m²

Total excavated depth of soakaway : 2.00 m

Ground level to invert of inflow pipe : 1.00 m

Impermeable surface area (A) : 99.82 m²

Soil infiltration rate (f) : 2.22E-06 m/s

Rainfall ratio : 0.4

Aggregate void : 35%

Soakaway width 1.0 m	
Storm duration (min)	Soakaway length (m)
5	2.55
10	3.65
15	4.45
30	5.65
60	6.90
120	8.15
240	9.20
360	9.70
<u>600</u>	<u>9.95</u>
1440	9.65

NOTE: Critical storm durations are underlined

Total excavated volume = 19.90 m³

Volume of granular fill required = 9.95m³

Emptying time to 50% storage = 19.9 hours

Calculations are in accordance with BRE Digest 365

Results from design calculations for trench soakaway

Small Drove, Weston : 124.32m²

Total excavated depth of soakaway : 2.00 m

Ground level to invert of inflow pipe : 1.00 m

Impermeable surface area (A) : 124.32 m²

Soil infiltration rate (f) : 2.22E-06 m/s

Rainfall ratio : 0.4

Aggregate void : 35%

Soakaway width 1.0 m	
Storm duration (min)	Soakaway length (m)
5	3.20
10	4.55
15	5.55
30	7.00
60	8.60
120	10.15
240	11.50
360	12.10
<u>600</u>	<u>12.45</u>
1440	12.10

NOTE: Critical storm durations are underlined

Total excavated volume = 24.90 m³

Volume of granular fill required = 12.45m³

Emptying time to 50% storage = 20.3 hours

Calculations are in accordance with BRE Digest 365

Results from design calculations for trench soakaway

Small Drove, Weston : 139.02m²

Total excavated depth of soakaway : 2.00 m

Ground level to invert of inflow pipe : 1.00 m

Impermeable surface area (A) : 139.02 m²

Soil infiltration rate (f) : 2.22E-06 m/s

Rainfall ratio : 0.4

Aggregate void : 35%

Soakaway width 1.0 m	
Storm duration (min)	Soakaway length (m)
5	3.55
10	5.10
15	6.20
30	7.85
60	9.65
120	11.35
240	12.85
360	13.55
<u>600</u>	<u>13.90</u>
1440	13.55

NOTE: Critical storm durations are underlined

Total excavated volume = 27.80 m³

Volume of granular fill required = 13.90m³

Emptying time to 50% storage = 20.4 hours

Calculations are in accordance with BRE Digest 365

Results from design calculations for trench soakaway

Small Drove, Weston : 140.65m²

Total excavated depth of soakaway : 2.00 m

Ground level to invert of inflow pipe : 1.00 m

Impermeable surface area (A) : 140.65 m²

Soil infiltration rate (f) : 2.22E-06 m/s

Rainfall ratio : 0.4

Aggregate void : 35%

Soakaway width 1.0 m	
Storm duration (min)	Soakaway length (m)
5	3.60
10	5.15
15	6.30
30	7.95
60	9.75
120	11.50
240	13.00
360	13.70
<u>600</u>	<u>14.10</u>
1440	13.70

NOTE: Critical storm durations are underlined

Total excavated volume = 28.20 m³

Volume of granular fill required = 14.10m³

Emptying time to 50% storage = 20.4 hours

Calculations are in accordance with BRE Digest 365

APPENDIX D

Anglian Water Pre-Planning Enquiry

Pre Planning Assessment Report

Small Drove, Weston

Section 1: Proposed Development

Thank you for submitting a pre planning enquiry. This has been produced for South Holland District Council. Your reference number is **00002616**. If you have any questions upon receipt of this report, please contact Sandeep Bains on 01733 414690 or email planningliaison@anglianwater.co.uk.

The response within this report has been based on the following information which was submitted as part of your application:

List of Planned Developments		
Type of Development	Type of Unit	No. Of Units
C3 Dwellings	Dwellings	40

The anticipated residential build rate is:

Year	2014
Build Rate	40

- The grid reference for the site is TF29262482.
- The site currently does not have planning permission and is located on a Brownfield site.

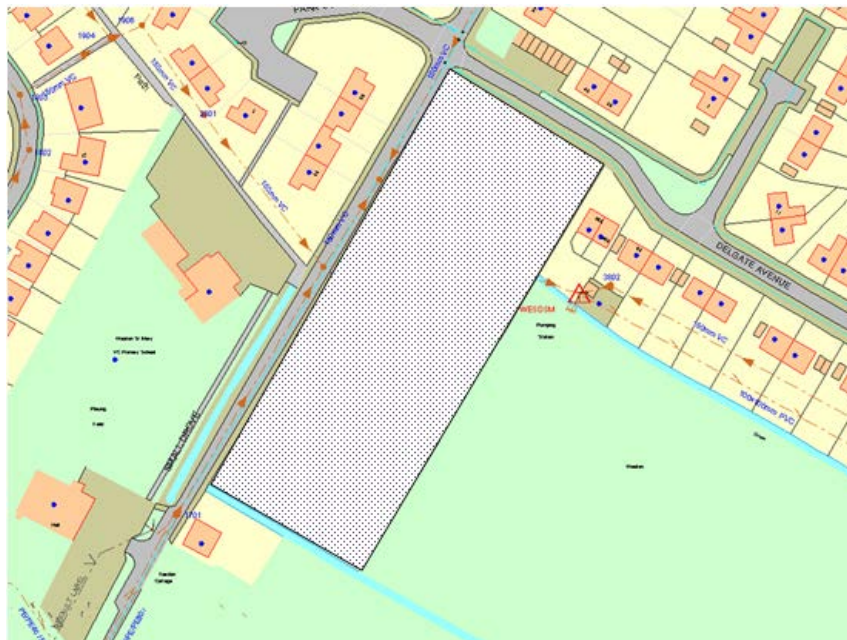


Figure 1: Location of proposed development

The comments contained within this report relate to the public water mains and sewers indicated on our records. Your attention is drawn to the disclaimer in the useful information section of this report.

Section 2: Assets Affected

Our records indicate that we have the following asset within or overlapping the boundary of your development site as listed in the table below.

Additionally, it is highly recommended that you carry out a thorough investigation of your proposed working area to establish whether any unmapped public or private sewers and lateral drains are in existence. We are unable to permit development either over or within the easement strip without our prior consent. The extent of the easement is provided in the table below. Please be aware that the existing public sewers should be located in highway or open space and not in private gardens. This is to ensure available access for any future maintenance and repair and this should be taken into consideration when planning your site layout.

Water and Used Water Easement Information		
Asset Type	Pipe Size (mm)	Total Easement Required (m)
Public Foul Sewer	150	3.0 m either side of the centre line

If it is not possible to avoid our assets then the sewer may need to be diverted in accordance with Section 185 of the Water Industry Act (1991). We have a duty to divert our sewerage infrastructure if requested to do so although this would be at your expense. You will need to make a formal application if you would like a diversion to be considered. A copy of the section 185 diversion application form can be found at www.anglianwater.co.uk/developers

Anglian Water notes the proximity of this development to WESDSM sewage pumping station, from which odour emissions and noise may be detectable at neighbouring property. We consider residential development in land within 15m of the operational boundary of a sewage pumping station to be at risk of a loss of amenity due to the operation of the pumping station. Therefore, we would advise that habitable buildings and their associated high amenity areas, such as gardens, should be kept at least 15 metres from the compound perimeter of WESDSM pumping.

Due to the private sewer transfer in October 2011 many newly adopted public used water assets and their history are not indicated on our records. You also need to be aware that your development site may contain private water mains, drains or other assets not shown on our records. These are private assets and not the responsibility of Anglian Water but that of the landowner.

Section 3: Water Recycling Services

In examining the used water system we assess the ability for your site to connect to the public sewerage network without causing a detriment to the operation of the system. We also assess the receiving water recycling centre and determine whether the water recycling centre can cope with the increased flow and influent quality arising from your development

Water Recycling Centre

The foul drainage from the proposed development is in the catchment of Moulton Water Recycling Centre, which currently has capacity to treat the flows from your development site. Anglian Water cannot reserve capacity and the available capacity at the water recycling centre can be reduced at any time due to growth and due to environmental and regulation driven changes.

Used Water Network

Anglian Water has assessed the impact of gravity flows from the planned development to the public foul sewerage network. We can confirm that this is acceptable as the foul sewerage system, at present, has available capacity for your site. The connection point will be to a point suitable to the new development layout, within the site boundary.

Surface Water Disposal

There are no public surface water sewers within the vicinity of the proposed development. Therefore Anglian Water will be unable to provide the site with a feasible solution of surface water disposal within the current assets. Alternative methods of surface water disposal will need to be investigated such as infiltration techniques or a discharge to a watercourse in accordance with the surface water management hierarchy as outlined in Building Regulations Part H. A new surface water sewer can be used as a mechanism to discharge surface water to a watercourse or as part of a SuDs scheme where appropriate. Subject to the sewer being designed in accordance with the current version of Sewers For Adoption, the sewer can be put forward for adoption by Anglian Water under Section 104 of the Water Industry Act 1991. If the outfall is to a watercourse, the applicant will be required to obtain consent to discharge via the appropriate body.

As you may be aware, Anglian Water will consider the adoption of SuDs provided that they meet the criteria outline in our SuDs adoption manual. This can be found on our website at www.anglianwater.co.uk/developers/sewer-connection/suds.aspx. We will adopt features located in public open space that are designed and constructed, in conjunction with the future SuDs Approving Body, to the criteria within our SuDs adoption manual. Specifically, developers must be able to demonstrate:

1. Effective upstream source control,
2. Effective exceedance design, and
3. Effective maintenance schedule demonstrating that the assets can be maintained both now and in the future with adequate access.

Our preference is that the Local Authority is requested to adopt in the first instance as duty will pass to them in future legislation. Consequently as part of your submission, evidence will need to be provided to show that you have approached the local authority. If you wish to look at the adoption of any SuDs then an expression of interest form can be found on our website at:

http://www.anglianwater.co.uk/assets/media/SuDS_Adoption_Form_2012.pdf

Trade Effluent

We note that you do not have any trade effluent requirements. Should this be required in the future you will need our written formal consent. This is in accordance with Section 118 of the Water Industry Act (1991).

Used Water Budget Costs

It has been assumed that the onsite used water network will be provided under a section 104 Water Industry Act application. It is recommended that you also budget for both infrastructure charges and connection costs. The 2014/15 charges are:

Infrastructure Charge	£345.00 per connection
S104 Supervision and inspection costs	2.5% of estimated construction costs
S104 Survey costs	10% of estimated construction costs

Section 4: Map of Proposed Connection Points

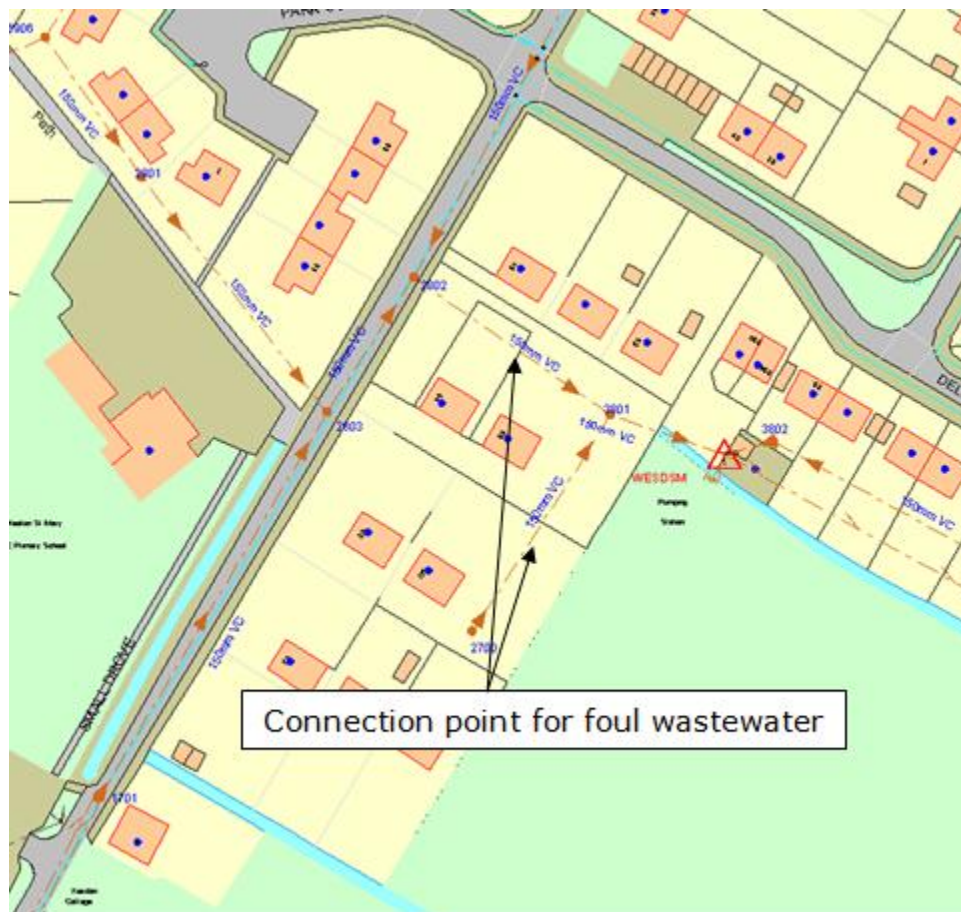


Figure 2: Showing your used water point of connection at a suitable location within the site boundary.

Section 5: Useful Information

Water

Water Industry Act – Key Water Sections:

- **Section 41:** This provides you with the right to requisition a new water main to connect your site to the public water network.
- **Section 45:** This provides you with a right to have a connection from a building or part of a building to the public water main.
- **Section 51A:** This provides you with the right to provide the water main or service connection yourselves and for us to vest them into our company.
- **Section 185:** This provides you with the right to have a public water asset diverted. Details on how to make an application and the s185 form is available on our website at <http://www.anglianwater.co.uk20/developers> or via our Developer Services team on 08457 60 66 087.

Details on how to make a formal application for a new water main, new connection or diversion are available on our website at www.anglianwater.co.uk/developers or via our Developer Services team on 08457 60 66 087.

If you have any other queries on your rights to requisition or connect your housing to the public water and used water infrastructure then please contact our developer services team at: Developer Services, Anglian Water, PO Box 495, Huntingdon, PE29 6YY or Telephone: 0845 60 66 087 or Email: developerservices@anglianwater.co.uk

Self Lay of Water Mains: A list of accredited Self Lay Organisations can be found at www.lloydsregister.co.uk/schemes/WIRS/providers-list.aspx.

Water pressure and flow rate:

The water pressure and consistency that we must meet for your site is laid out in the Water Industry Act (1991). This states that we must supply a flow rate of 9 litres per second at a pressure of 10 metres of head to the external stop tap. If your water pressure requirements exceed this then you will need to provide and maintain any booster requirements to the development site.

Used Water

Water Industry Act – Key Used Water Sections:

- **Section 98:** This provides you with the right to requisition a new public sewer. The new public sewer can be constructed by Anglian Water on your behalf. Alternatively, you can construct the sewer yourself under section 30 of the Anglian Water Authority Act 1977.
- **Section 102:** This provides you with the right to have an existing sewerage asset vested by us. It is your responsibility to bring the infrastructure to an adoptable condition ahead of the asset being vested.

- **Section 104:** This provides you with the right to have a design technically vetted and an agreement reached that will see us adopt your assets following their satisfactory construction and connection to the public sewer.
- **Section 106:** This provides you with the right to have your constructed sewer connected to the public sewer.
- **Section 185:** This provides you with the right to have a public sewerage asset diverted.

Details on how to make a formal application for a new sewer, new connection or diversion are available on our website at www.anglianwater.co.uk/developers or via our Developer Services team on 08457 60 66 087.

Sustainable Drainage Systems:

Many existing urban drainage systems can cause problems of flooding, pollution or damage to the environment and are resilient to climate change in the long term. Therefore our preferred method of surface water disposal is through the use of Sustainable Drainage Systems (SuDS). SuDS are a range of techniques that aim to mimic the way surface water drains in natural systems within urban areas. For more information on SuDS, please visit our website at <http://anglianwater.co.uk/developers/sewer-connection/suds.aspx>. We also recommend that you contact the future SuDS Approving Body (SAB) for the area to discuss your application.

Private Sewer Transfers: Sewers and lateral drains connected to the public sewer on the 1 July 2011 transferred into Water Company ownership on the 1 October 2011. This follows the implementation of the Floods and Water Management Act (FWMA). This included sewers and lateral drains that were subject to an existing Section 104 Adoption Agreement and those that were not. There were exemptions and the main non-transferable assets were as follows:

- Surface water sewers and lateral drains that did not discharge to the public sewer, e.g. those that discharged to a watercourse.
- Foul sewers and lateral drains that discharged to a privately owned sewage treatment/collection facility.
- Pumping stations and rising mains will transfer between 1 October 2011 and 1 October 2016.

The implementation of Section 42 of the FWMA will ensure that future private sewers will not be created. It is anticipated that all new sewer applications will need to have an approved section 104 application ahead of a section 106 connection.

Encroachment: Anglian Water operates a risk based approach to development encroaching close to our used water infrastructure. We assess the issue of encroachment if you are planning to build within 400 metres of a water recycling centre or, within 15 metres to 100 metres of a pumping station. We have more information available on our website at <http://anglianwater.co.uk/developers/encroachment.aspx>

Locating our assets: Maps detailing the location of our water and used water infrastructure including both underground assets and above ground assets such as pumping stations and recycling centres are available from www.digdat.co.uk. All requests from members of the public or non-statutory bodies for maps showing the location of our assets will be subject to an appropriate administrative charge. We have more information on our website at: www.anglianwater.co.uk/developers/our-assets/

Summary of charges: A summary of this year's water and used water connection and infrastructure charges can be found at <http://www.anglianwater.co.uk/developers/charges/>

Disclaimer: The information provided within this report is based on the best data currently recorded, recorded within the last 12 months or provided by a third party. The position must be regarded as approximate. If there is further development in the area or for other reasons the position may change.

The accuracy of this report is therefore not guaranteed and does not obviate the need to make additional appropriate searches, inspections and enquiries. You are advised therefore to renew your enquiry should there be a delay in submitting your application for water supply/sewer connection to re-confirm the situation.

Any cost calculations provided within the report are estimated only and may be subject to change.

The responses made in this report are based on the presumption that your proposed development obtains planning permission. Whilst this report has been prepared to help assess the viability of your proposal, it must not be considered in isolation. Anglian Water supports the plan led approach to sustainable development that is set out in the National Planning Policy Framework (NPPF). As a spatial planning statutory consultee, we assist planning authorities in the preparation of a sustainable local plan on the basis of capacity within our water and water recycling (formerly referred to as wastewater) infrastructure. Consequently, any infrastructure needs identified in this report must only be considered in the context of up to date, adopted or emerging local plans. Where local plans are absent, silent or out of date these needs should be considered against the definition of sustainability set out in the NPPF as a whole.

No liability whatsoever including liability for negligence is accepted by Anglian Water Services Limited for any error or inaccuracy or omission including the failure to accurately record or record at all, the location of any water main, discharge pipe, sewer, or drain or disposal main or any item of apparatus.

Contacting us: If you have any comments or suggestions based on the information provided in this report then please feel free to contact on Sandeep Bains 01733 414690 or email planningliason@anglianwater.co.uk

APPENDIX E

Proposed Drainage Layout



Key:

Proposed private surface water drain

Proposed private surface water manhole

Proposed private trench soakaway

Proposed permeable parking area

Area <5m from building or highway available for soakaways

Proposed private foul drain

Proposed private foul manhole

Existing foul sewer

Proposed S38 Boundary

Proposed Adoptable Permeable Paving

Proposed Private Permeable Paving

W&S Saunders is the trading name of Wm Saunders Partnership LLP. Wm Saunders Partnership Limited Liability Partnership is registered in England and Wales with the Registration number OC 388323. The Registered Office is Sheppard Lockton House, Cafferata Way, Newark-on-Trent, Notts, NG24 2TN.

This drawing & any design thereon is the copyright of Wm Saunders Partnership LLP and must not be reproduced without their written consent.

Contractors must verify all dimensions, levels and co-ordinates of the site before commencing any work or making any shop drawings: no dimensions to be taken from drawing.

Notes:

Soakaways have been calculated using an infiltration rate of 2.22 x10-06 m/s.

Soakaways have been calculated as trench fill soakaways with 35% void fill material.

Foul drainage is to be discharged to the existing public foul sewer crossing the site as indicated by Anglian Water in the pre-planning enquiry response ref: 00002616.

Positions of SVP's and RWP's to be confirmed by Architect.

Issued for submission with Drainage Strategy		CM	AG	04/18
Rev	Description	Drm	Vfd	Date
As outlined in section 2.3 of the CIB Industry Guidance to Designers, insignificant risks can usually be ignored, as can risks arising from routine construction activities, unless the design compounds or significantly alters these risks. In accordance with CDM Regulations 8, 9 and 11, any significant risks relating to the design features shown on this drawing have been identified and are annotated thus: 				
☒ No significant risks have been identified.				
☐ Significant risks have been identified - refer to notes on drawing for information on residual risks and any control measures to be employed.				
Refer to the current Designer's Risk Assessment sheets for further details.				
Designer's Signature		CM	Date 04/18	

Drawing Status

PLANNING

williamsaunders
architecture: engineering: building consultancy

Sheppard Lockton House
Cafferata Way
Newark-on-Trent
Nottinghamshire, NG24 2TN

Tel: 01636 704361
Fax: 01636 702809
W: wm-saunders.co.uk

Also at Leeds, Cardiff, Wlrmsworth

Project RESIDENTIAL DEVELOPMENT SMALL DROVE WESTON SPALDING			
Client WELLAND HOMES			
Title DRAINAGE STRATEGY			
Drawn CM	Date APRIL 2018	Scale 1:200	@ A1
Discipline CIVILS	Project Number 11505	Drawing Number (SK)01	Revision -

williamsaunders
architecture : engineering : building consultancy

Sheppard Lockton House
Cafferata Way
Newark-on-Trent
Nottinghamshire NG24 2TN

Tel: 01636 704361
Fax: 01636 702809
W: wm-saunders.co.uk

Also at: Newark : Leeds : Cardiff : Wircsworth