

APPENDIX E: Southern Water Records & Constraints Plan

N\14-159 - Land at Chestnut Ave. Eastleigh\Tech\Acad\Drawings\3000 Series - Local Centre\14-159-3037 Local Centre Constraints Plan.dwg



- NOTES**
1. ALL DIMENSIONS SHOWN IN METRES UNLESS NOTED OTHERWISE.
 2. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
 3. TREES TO BE INSTALLED IN ACCORDANCE WITH LANDSCAPERS TREE PIT DETAILS
 4. NO DESIGN ALLOWANCE FOR POSITIVE CONNECTION INTO SURFACE DRAINAGE NETWORK.
 5. SURFACE WATER DRAINAGE:
 - DRAINAGE STRATEGY IS BASED ON SOAKAWAY ATTENUATION TANKS WITH VARYING INFILTRATION RATES INTO EXISTING GROUND.
 - NO CONNECTION TO PIPED DRAINAGE SYSTEM
 6. REFER TO SOAKAWAY INFILTRATION RATES (m/sec) SL15 AS PER GROUND INVESTIGATION REPORT NO. 17270/SI., PAGE 3, TABLE 2 BY SOILS (NOVEMBER 2018)
 7. FOUL WATER DRAINAGE:
 - MAXIMUM FLOW RATE INTO FOUL WATER NETWORK TO BE 1.00 l/s.
 - CONNECTION TO FOUL WATER NETWORK TO THE EAST

- LEGEND:**
- PHASE BOUNDARY
 - ⊕ PROPOSED TREE
 - ROOT PROTECTION ZONE
 - HCC EASEMENT FOR KERBS AND STREET LIGHTING COLUMNS
 - STREET LIGHTING COLUMN (NOT TO SCALE)
 - S104 DRAINAGE EASEMENT ADOPTABLE BY LEEP
 - SOUTHERN WATER MAIN EASEMENT
 - FOUL WATER DRAINAGE
 - ⊠ ROAD GULLY AS PER HCC STANDARDS
 - ⊕ SURFACE WATER DRAINAGE
 - 2.5m WIDE FILTER DRAIN AND 375mm PERFORATED PIPE

Rev	Amendments	Drm	Chk	App	Date
-	-	-	-	-	-

**ODYSSEY**

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Unit 3 Winchester Hill Business Park
Winchester Hill, Romsey
Southampton SO51 7UT

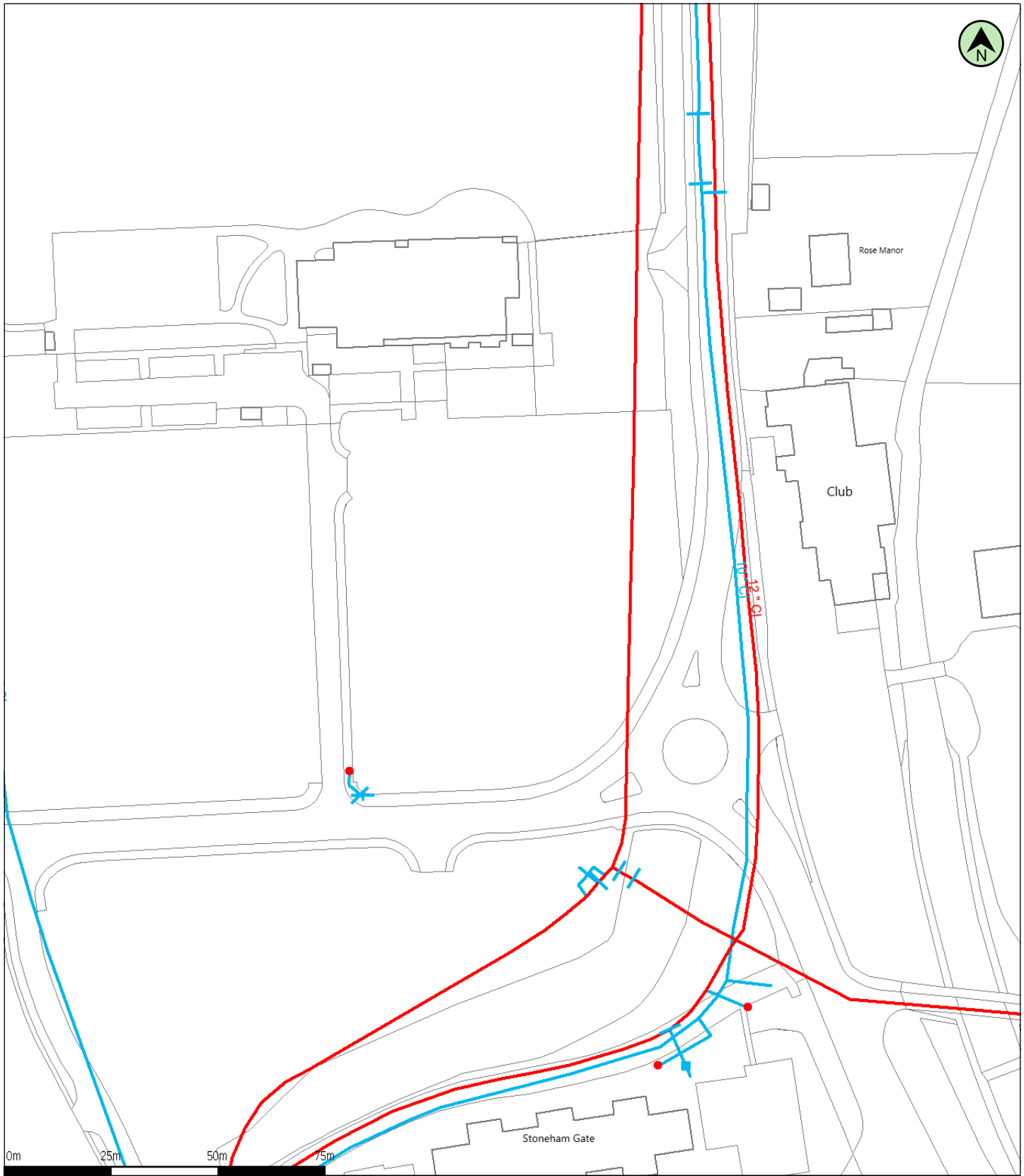
Telephone: 01256 331144
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Job Title
STONEHAM, LAND AT CHESTNUT AVE. EASTLEIGH

Drawing Title
**CONSTRAINTS PLAN
LOCAL CENTRE**

**HIGHWOOD
CONSTRUCTION**

Scale 1:200 @ A1	Date MARCH 2021	Designed OC
Drawn OC	Checked SW	Approved BAC
Job No 14-159	Drawing No 14-159-3037	Rev



(c) Crown copyright and database rights 2021 Ordnance Survey 100031673 Scale: 1:1250 Date: 15/06/21 Clean Water Plan A4
 Data updated: 17/05/21 Map Centre: 444170,117580 Our Ref: 578846 - 1 Powered by digdat

Water Main	Proposed Main	Trunk Main	Non-potable Main	Abandoned Main
Water Hydrant	Water Meter	Water Valve		

payments.utilitysolutions@atkinsglobal.co

97020

CHECKED

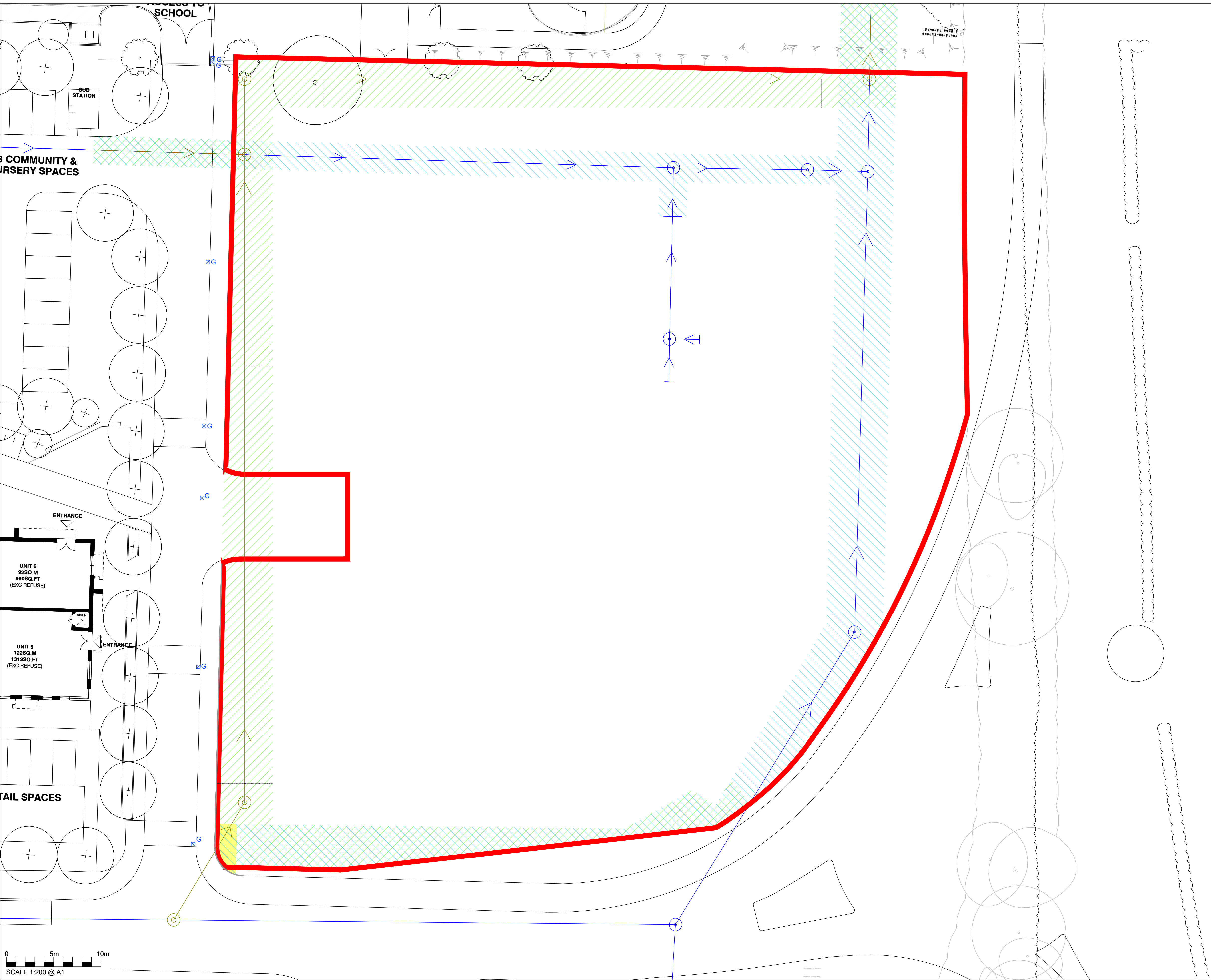


The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2021 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

APPENDIX F: Foul Water Sewer Diversion Plans



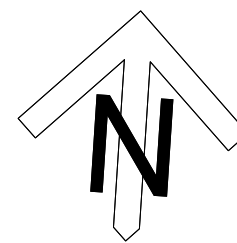
RIBA
Chartered Practice

ARB
Architects
Registration
Board

CIAT
Chartered Institute of
Architects

DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO START OF WORKS AND ODA TO BE INFORMED OF DISCREPANCIES IMMEDIATELY. NO DIMENSIONS TO BE SCALED FROM THIS DRAWING.
ALL MATERIALS AND WORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE LATEST REVISION OF THE APPROPRIATE BRITISH STANDARDS OR EURO CODE, PLANNING APPROVAL, CURRENT BUILDING REGULATIONS AND CODES OF PRACTICE.
PARTY WALL ACT - NOTICES UNDER THE PARTY WALL ACT ARE TO BE SERVED BY THE PROPERTY OWNER OR APPOINTED THIRD PARTY BY PROPERTY OWNER. HEALTH AND SAFETY - CDM 2015 REGULATIONS APPLY TO ALL CONSTRUCTION WORKS TO BE CARRIED OUT AND APPLY TO DESIGNERS, CONTRACTORS AND THE CLIENT, AS SUCH ALL PARTIES HAVE DUTIES UNDER THESE REGULATIONS.

— BLUE INDICATING EXISTING SEWER LOCATION
— GREEN INDICATING PROPOSED SEWER DIVERSION



Rev	Description	Date	Rev by	Chk by
-----	-------------	------	--------	--------

Revisions

Client
LIDL GREAT BRITAIN LTD.
Foxes Park, Brownhill Way,
Nursling, Hampshire, SO16 0AW
Project
STONEHAM LANE,
SOUTHAMPTON
Drawing
PROPOSED SITE PLAN
LEGAL PLAN SEWER RELOCATION
Project No: 20321
Drawing No: AD_056

Purpose of Issue
INFORMATION

Scale @ A1
1:200

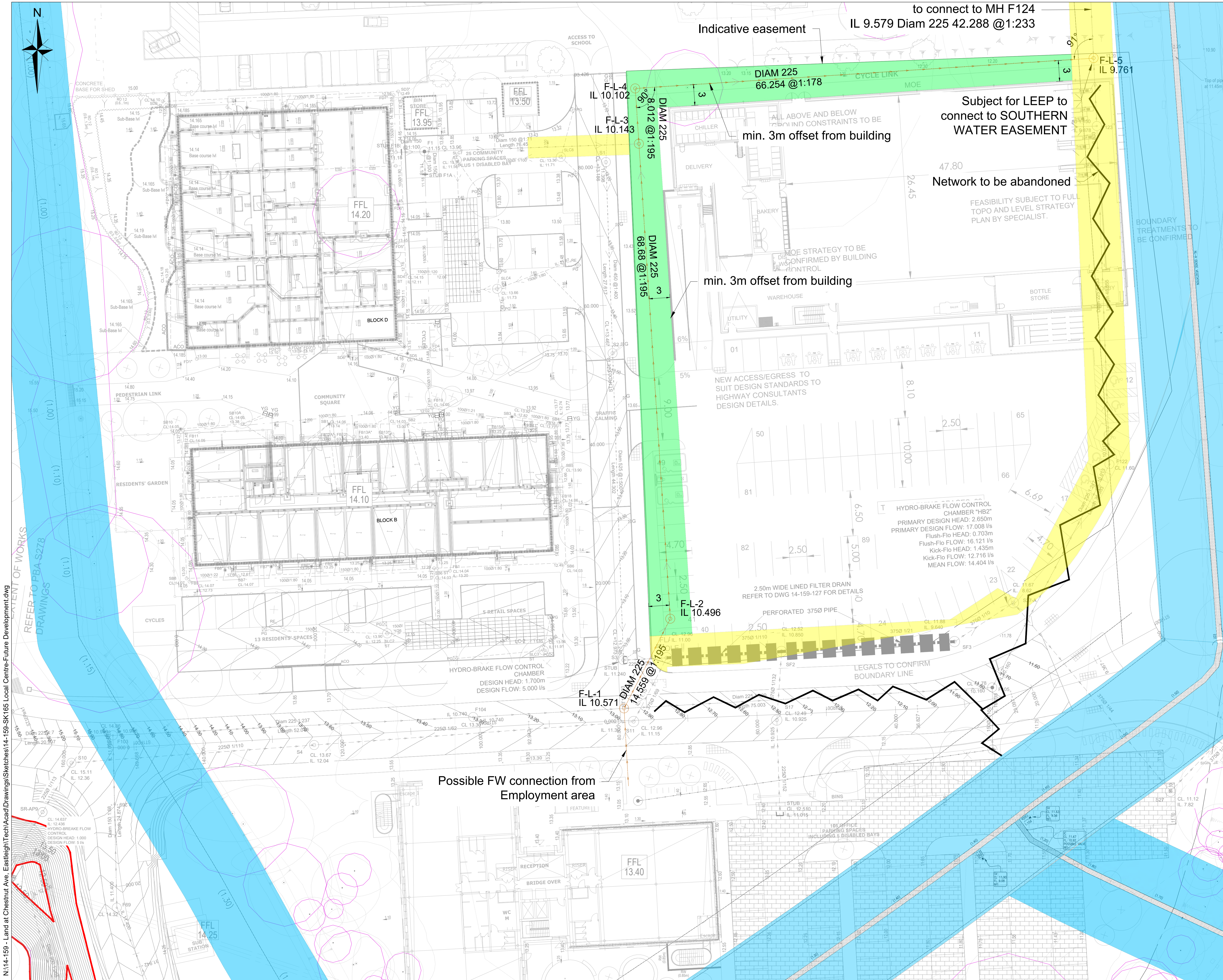
Drawn	Checked
EH	GAP
Revision	Date
-	NOV 2021

ON DESIGN
architects

One Design Architects Ltd, Unit 5 Mercury Quays, Ashley Lane, Shipley,
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Registered in England & Wales No: 08355643

Architectural

DO NOT USE FOR CONSTRUCTION



NOTES

LEGEND

- PROPOSED SURFACE WATER NETWORK
- SURFACE WATER NETWORK UNDER SEPARATE APPLICATION
- PROPOSED FOUL WATER NETWORK
- FOUL WATER NETWORK UNDER SEPARATE APPLICATION
- EXISTING INFILTRATING ATTENUATION CELLULAR SOAKAWAY
- ROOT PROTECTION AREA
- TRACED LOCATION OF EXISTING SOUTHERN WATER MAIN
- S104 DRAINAGE EASEMENT ADOPTABLE BY LEEP
- SOUTHERN WATER MAIN EASEMENT
- FUTURE DEVELOPMENT S104 EASEMENT ADOPTABLE BY LEEP

to connect to MH F124
IL 9.579 Diam 225 42.288 @1:233

Indicative easement

min. 3m offset from building

Subject for LEEP to connect to SOUTHERN WATER EASEMENT

Network to be abandoned

FEASIBILITY SUBJECT TO FULL TOPO AND LEVEL STRATEGY PLAN BY SPECIALIST.

min. 3m offset from building

NEW ACCESS/EGRESS TO SUIT DESIGN STANDARDS TO HIGHWAY CONSULTANTS DESIGN DETAILS.

HYDRO-BRAKE FLOW CONTROL CHAMBER "HB2"
PRIMARY DESIGN HEAD: 2.650m
PRIMARY DESIGN FLOW: 17.008 l/s
Flush-Flo HEAD: 0.703m
Flush-Flo FLOW: 16.121 l/s
Kick-Flo HEAD: 1.435m
Kick-Flo FLOW: 12.716 l/s
MEAN FLOW: 14.404 l/s

2.5m WIDE LINED FILTER DRAIN
REFER TO DWG 14-159-127 FOR DETAILS

PERFORATED 375Ø PIPE

LEGALS TO CONFIRM BOUNDARY LINE

Possible FW connection from Employment area

Rev	A	MINOR UPDATES TO DRAINAGE LAYOUT	OC	RP	BAC	18.06.21
Amendments			Dm	Chk	App	Date

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Job Title
STONEHAM, LAND AT CHESTNUT AVE. EASTLEIGH

Drawing Title
**PRELIMINARY DRAINAGE STRATEGY
FUTURE DEVELOPMENT TO EAST**

Client
HIGHWOOD CONSTRUCTION

Scale 1:250 @ A1	Date 06.2021	Designed OC
Drawn OC	Checked RP	Approved BAC
Job No 14-159	Drawing No SK165	Rev A

APPENDIX G: Planning Background, Local Centre Drainage Strategy

LOCAL CENTRE, NORTH STONEHAM PARK, EASTLEIGH

**SURFACE WATER STRATEGY AND DESIGN STATEMENT
ADDENDUM TO THE FLOOD RISK ASSESSMENT AND SURFACE WATER
STRATEGY AND DESIGN STATEMENT FOR NORTH STONEHAM PARK
PHASE 1**

Prepared by

Odyssey

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November 2018



1.0 INTRODUCTION

- 1.1 This report, Surface Water Management and Drainage Strategy, has been prepared by Odyssey on behalf of Highwood Homes in support for Reserved matters for appearance, landscaping, layout and scale (pursuant to outline planning permission O/15/76023 which was subject to Environmental Impact Assessment) for the provision of a Local Centre on the North Stoneham Park site including retail, café, gymnasium, community centre, nursery, offices and 26 age restricted flats in addition to associated access roads, drainage, car parking, refuse storage, boundary treatments and other supporting works and infrastructure.
- 1.2 Within the report the design procedure of the Surface Water Drainage Strategy will be described and its evolvement from the proposed drainage strategy incorporated within the approved document **Land South of Chestnut Avenue, North Stoneham Park – Flood Risk Assessment** prepared by Ramboll UK Limited (Ramboll) with final issue dated the 11th of February 2015, referred to as the FRA in the report.
- 1.3 The report will also form a supplementary document to the previously submitted and approved 14-159-02 Rev E Surface Water Strategy and Design Statement Addendum to the FRA for the North Stoneham Park Phase 1, referred to as the “SWDS Phase 1” in the report, where the proposal forms part of the overall drainage strategy.
- 1.4 Preliminary SuDS maintenance and management procedures are outlined within the report.



2.0 SURFACE WATER DRAINAGE STRATEGY

2.1 The Local Centre proposals form part of **Sector D** within the overall drainage strategy described in detail within the SWDS Phase 1 report. Figure 1 below gives a visual representation of the Sector's position within the development, with an indication of the location of the Local Centre proposals. The proposed Local Centre layout is presented in Appendix A.

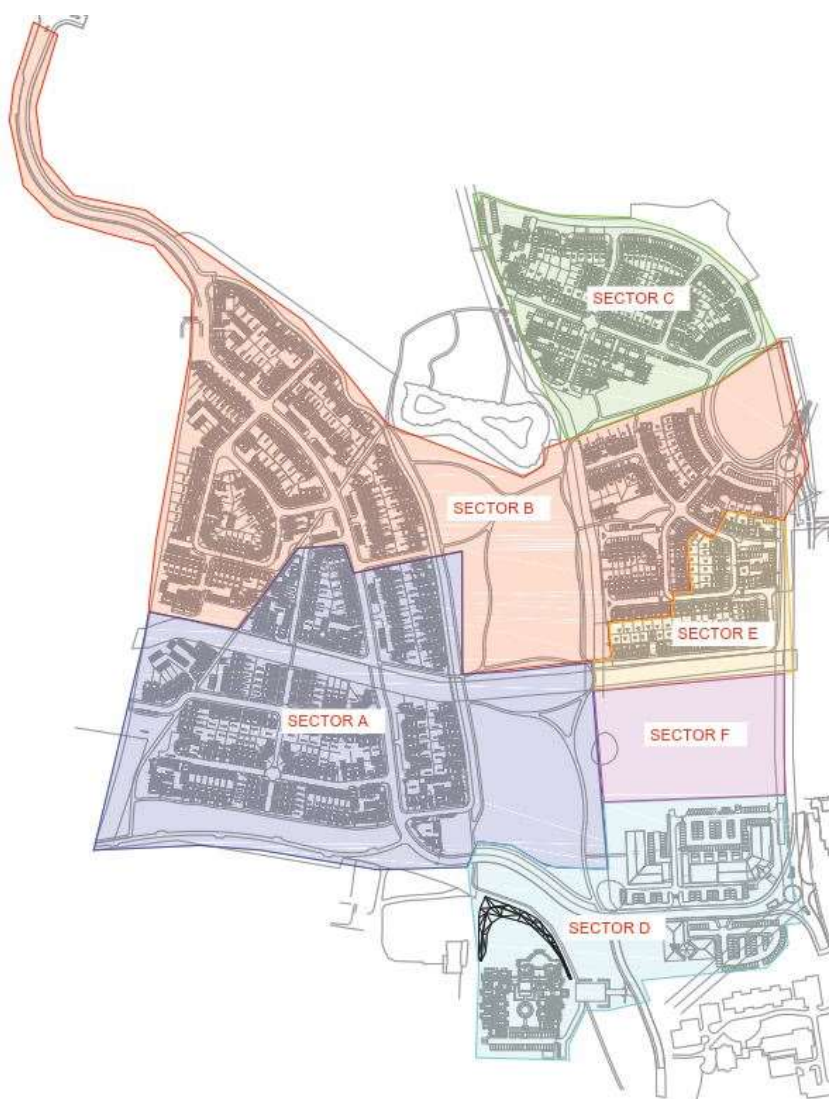


Figure 1 Sectors Position Within the Development

2.2 Following the recommendation of the SWDS Phase 1, a Sector D discharge allowance of 17 l/s, was distributed along the elements forming the Sector. There were two stubs, with restricted flow rate of 5 l/s each, provided for the surface water discharge generated by the Local Centre proposals to connect to the main surface water drainage for Sector D. It is to be noted that within SWDS Phase 1 and the FRA, no capacity for infiltration was assumed, thus providing the worst-case scenario.



2.3 Following a detail soakaway investigation, carried out to BRE 365 by Soils Limited, infiltration rates for the area were determined. These rates are illustrated within Table 1 below and the Soils Limited report is presented in Appendix B.

2.4 Given the soakaway potential of the area, soakaway crates were utilised to discharge the surface water catchment generated by the Local Centre buildings and carparks. The surface water will be conveyed via pipe network to the aforementioned soakaway crates employing silt traps and trapped gullies to treat the discharge prior to entering the system. A copy of the Drainage Strategy is presented within Appendix C.

2.5 Due to the location of the existing Southern Water 33 inch Water Main passing through the carpark of the Office building, north of the S278 works, permeable paving will be utilised to capture and discharge the rainfall that falls directly on the surface, thus having no adverse effect on the pipe state, mimicking the existing conditions of the area.

2.6 A separate drainage network was provided to discharge the flow generated by the main access road. The network will utilise the proposed stub, to connect to the main Sector D drainage, with a control discharge of 5 l/s via hydro-brake vortex flow control device. The drainage system is designed for flood events up to and including 1 in 100 year plus 30% climate change, with the attenuation provided within the pipe system.

2.7 The proposed on-site drainage system will be designed to cater for the 1 in 30 year storm, with no unintentional surface flooding, providing attenuation to store flood waters on-site during flood events up to and including the 1 in 100 year flood event plus allowance for 30% climate change.

2.8 For the proposed preliminary maintenance and management regimes of the Sustainable Drainage Systems, refer to Appendix D. This will be enhanced at the detailed design stage.

2.9 MicroDrainage calculations are presented as Appendix E.



3.0 CONCLUSION

3.1 The surface water drainage design for the Local Centre follows the principles set out in the FRA and SWDS Phase 1, with further evolution due to the detailed soakaway tests results obtained at the time of the report.

3.2 The surface water run-off generated from the proposed development area has been discharged via three different methods. The flows from the parking areas and building areas of the development will be conveyed via pipe network to soakaway crates and infiltrated in the ground. Due to the presence of the existing Southern Water 33 inch Water Main, the parking court for the Office building will utilize permeable paving, mimicking the existing conditions, by infiltrating the direct rainfall.

3.3 The school access road will have separate drainage pipe network and connect to the proposed stub near the S278 works, as intended within the SWDS Phase 1.

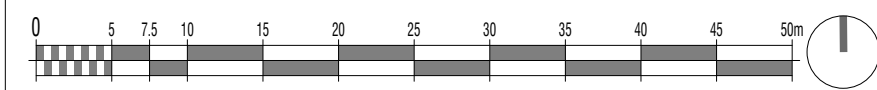
3.4 MicroDrainage Calculations are presented in Appendix E.

APPENDIX A

PROPOSED SITE LAYOUTS



NOTES:
FOR PLANNING



NOTE: Landscape layout is indicative. Refer to Deacon Design layout for surface finishes and boundary conditions.

CLIENT



Scale @ A1: 1:500
Date: NOVEMBER 2018

Drawn by: WT
Checked by: CK

TITLE

**LOCAL CENTRE, STONEHAM
GROUND FLOOR BUILDING
PLANS**

Drawing No:
17.005.201

Revision:



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REVISIONS

APPENDIX B

SOAKAWAY INVESTIGATION REPORT

APPENDIX B

SOAKAWAY INVESTIGATION REPORT

Highwood Group

By Email only: a.white@highwoodgroup.co.uk

Our Ref: 17270/SL

23rd November 2018

Dear Andrew,

RE: Stoneham, Land at Chestnut Avenue, Eastleigh, SO50 9HS.

We are writing regarding the intrusive investigation undertaken at the above-named site.

Brief

The Soils Limited quotation (reference Q20478/Rev104, dated 7th November 2018) set the scope of the investigation. The investigation was to comprise machine excavated trial holes and infiltration tests in accordance with the principles of BRE DG365: 2016 Soakaway Design.

General

The site had an approximate area of 18ha and was located at Chestnut Avenue, Eastleigh, SO50 9HS at O.S Land Ranger Grid Reference of SU439174.

A site location plan has been included as Figure 1.

Site Works

Site works were undertaken between the 12th and 15th November 2018 and comprised the excavation of sixteen trial pits (SL1-SL15 and SL15a) at locations selected by the client. Location SL15a was an additional location determined by conditions encountered on site, as SL15 collapsed upon encountering loose gravel. Following the construction of the trial holes, infiltration tests in accordance with the principles of BRE DG365:2016 were carried out within all trial holes, with the exception of SL2 and SL15.

Encountering water within trial pit SL2 resulted in the termination of the trial pit at 0.70m bgl and thus infiltration was not undertaken within the trial hole, the rate of water rise was however recorded. SL15 collapsed at 1.50m bgl and was relocated to SL15(a), infiltration testing was not undertaken in SL15.

A trial hole location plan is included as Figure 2.

Upon completion of the trial hole logging and testing the trial holes were backfilled with arisings and mounded over to allow for future settlement.

**Thomas Telford House
Sun Valley Business Park
Winnall Close
Winchester SO23 0LB**

**01962 673 330
soilslimited.co.uk**

Ground Conditions

The ground conditions encountered during the site investigation have been summarised in Table 1.

Made Ground and Top Soil (MG/TS)

River Terrace Deposits (RTD3)

London Clay Formation (LC)

Table 1 – Summary of Ground Conditions

Strata	Depth Encountered (m bgl)		Typical Description
	Top	Base	
MG/TS	0.00	0.10 – 1.00	Dark brownish grey sandy very clayey GRAVEL. Gravel is fine to cobble sub angular to sub rounded brick road stone and concrete.
RTD3	0.10 – 1.00	0.60 - 3.30 ¹	Orangish brown very clayey sandy GRAVEL. Gravel is fine to coarse sub angular to sub rounded flint.
LC	0.20 – 0.60	0.70 ¹ – 1.10 ¹	Orangish grey mottled silty gravelly CLAY. Gravel is sub angular to sub rounded, medium to coarse flint.

Notes: ¹ encountered to base of trial hole

The London Clay Formation was encountered within SL1 – SL3, where it was encountered directly underlying the Topsoil. In all other locations, the River Terrace Deposits were encountered underlying the Topsoil/Made Ground.

Infiltration Testing

Infiltration tests were performed in order to provide guidance on the suitability of the ground for the adoption of a surface water drainage system. The tests were undertaken within the River Terrace Deposits and the London Clay Formation from depths of between 0.85m and 3.30m bgl. The tests comprised piping clean water via a water tanker into the open trial hole, the drop-in water level over time was then recorded to give an indication of soakage potential.

BRE DG365:2016 states that for an accurate infiltration rate to be obtained a soakage pit needs to be filled three times in quick succession. Each test is completed once 75% of the water present has drained away, in order to determine whether or not the underlying ground conditions may be suitable for surface water drainage.

Only one test was carried out within locations SL1 – SL4, SL6, SL7 and SL9 due to the low head loss observed on site and the time available. No tests were carried out in either SL2, due to encountering water, and in SL15 as the hole was unstable.

Table 2 presents the infiltration test results performed within SL1 to SL15A.

Table 2 - Infiltration Test Results

Trial Hole (Test No.)	Test Stratum	Trial Pit Depth (m bgl)	Water Level Start of Test (m bgl)	Infiltration Rate (m/sec)	Comments
SL1	LC	0.85	0.30	Negligible	Drop in head of water too slow to extrapolate head loss
SL3	LC	1.10	0.64	Negligible	
SL4	RTD3	1.30	0.50	Negligible	
SL5(1)	RTD3	1.20	0.68	9.567×10^{-6}	Data extrapolated from 192 minutes.
SL5(2)	RTD3	1.10	0.74	2.802×10^{-6}	
SL5(3)	RTD3	1.10	0.71	1.599×10^{-5}	
SL6	RTD3	1.10	0.57	1.977×10^{-6}	Data extrapolated from 272 minutes.
SL7	RTD3	1.20	0.64	Negligible	
SL8(1)	RTD3	2.10	1.03	3.683×10^{-5}	
SL8(2)	RTD3	2.00	1.00	1.097×10^{-5}	Data extrapolated from 90 minutes.
SL8(3)	RTD3	2.00	1.00	3.068×10^{-5}	
SL9	RTD3	1.20	0.60	Negligible	
SL10(1)	RTD3	1.10	0.29	2.926×10^{-5}	Drop in head of water too slow to extrapolate head loss
SL10(2)	RTD3	1.10	0.31	2.072×10^{-5}	
SL10(3)	RTD3	0.90	0.29	2.507×10^{-5}	
SL11(1)	RTD3	1.10	0.64	6.810×10^{-5}	
SL11(2)	RTD3	1.10	0.59	5.070×10^{-5}	
SL11(3)	RTD3	0.95	0.50	4.085×10^{-5}	
SL12(1)	RTD3	1.10	0.61	3.270×10^{-5}	
SL12(2)	RTD3	1.00	0.45	4.793×10^{-5}	
SL12(3)	RTD3	1.00	0.43	6.053×10^{-5}	
SL13(1)	RTD3	1.55	1.04	4.808×10^{-5}	
SL13(2)	RTD3	1.45	1.02	6.090×10^{-5}	
SL13(3)	RTD3	1.40	1.06	5.942×10^{-5}	
SL14(1)	RTD3	3.20	2.24	3.286×10^{-4}	
SL14(2)	RTD3	3.10	2.56	2.830×10^{-4}	
SL14(3)	RTD3	3.10	2.94	2.315×10^{-4}	
SL15A(1)	RTD3	1.50	1.11	1.616×10^{-3}	Fast infiltration rates anticipated to be due to loose granular soils as SL15 had to be relocated due to collapsing.
SL15A(2)	RTD3	1.40	0.90	1.110×10^{-3}	
SL15A(3)	RTD3	1.40	0.95	8.460×10^{-4}	

Rates of between 1.616×10^{-3} m/sec and 1.977×10^{-6} m/sec were calculated based on the data from the tests within SL15A and SL6. It was not possible to calculate an infiltration rate for SL1, SL3, SL4, SL7 and SL9 as the head loss observed was not sufficient to accurately extrapolate. Encountering water within SL2 meant that carrying out infiltration testing was not possible.

Full results are included within Appendix A.

Conclusions

Figure 2. Trial Hole Location Plan**Figure number**

2

Title

Trial hole location plan

Project

Stoneham, Land at Chestnut Ave, Eastleigh, SO50 9HS.

Date

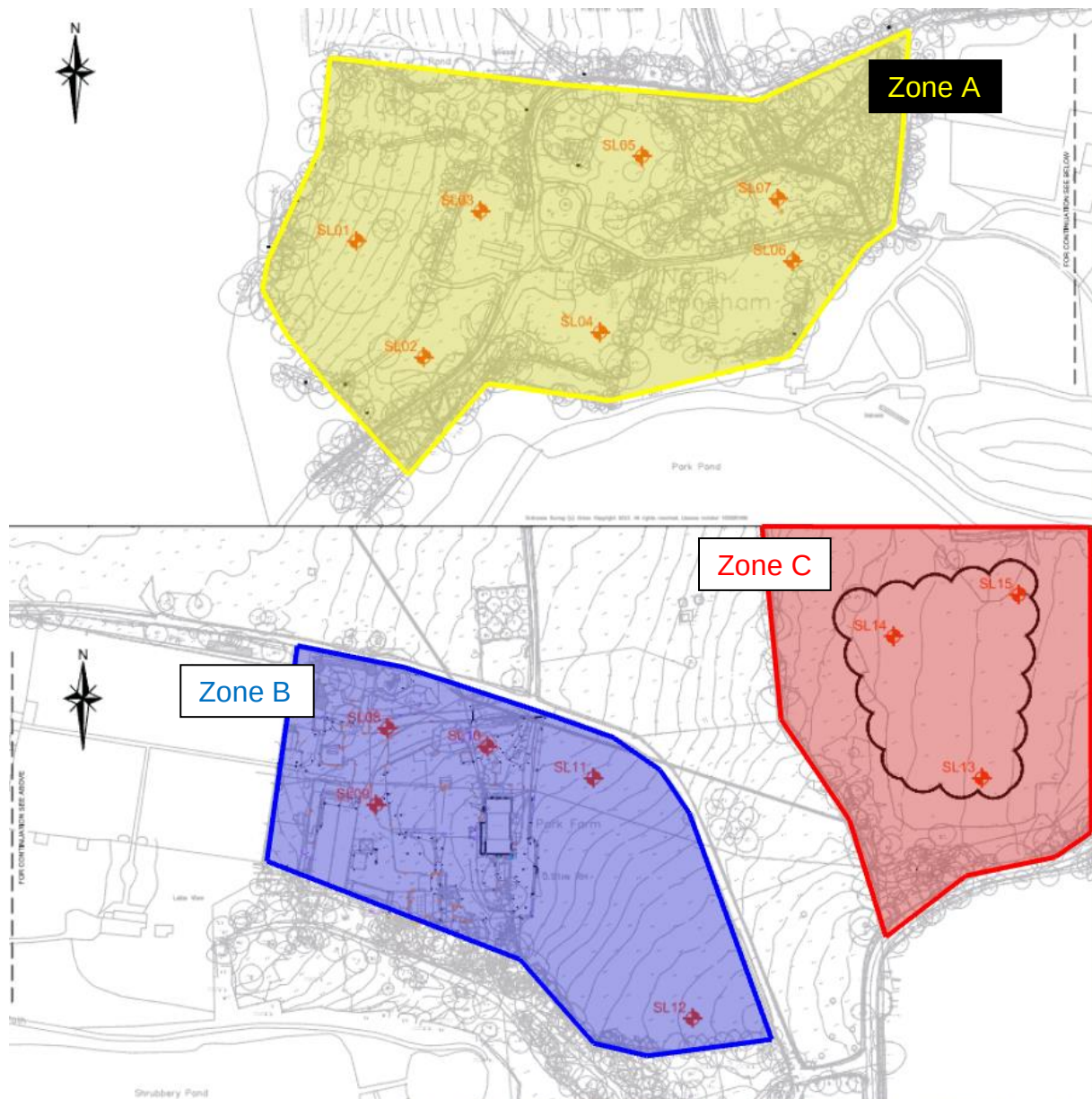
November 2018

Client

Highwood Group

Reference

I7270

Figure 3. Site Zonal Plan**Figure number**

3

Title

Site Zonal Plan

Project

Stoneham, Land at Chestnut Ave, Eastleigh, SO50 9HS.

Date

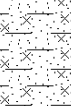
November 2018

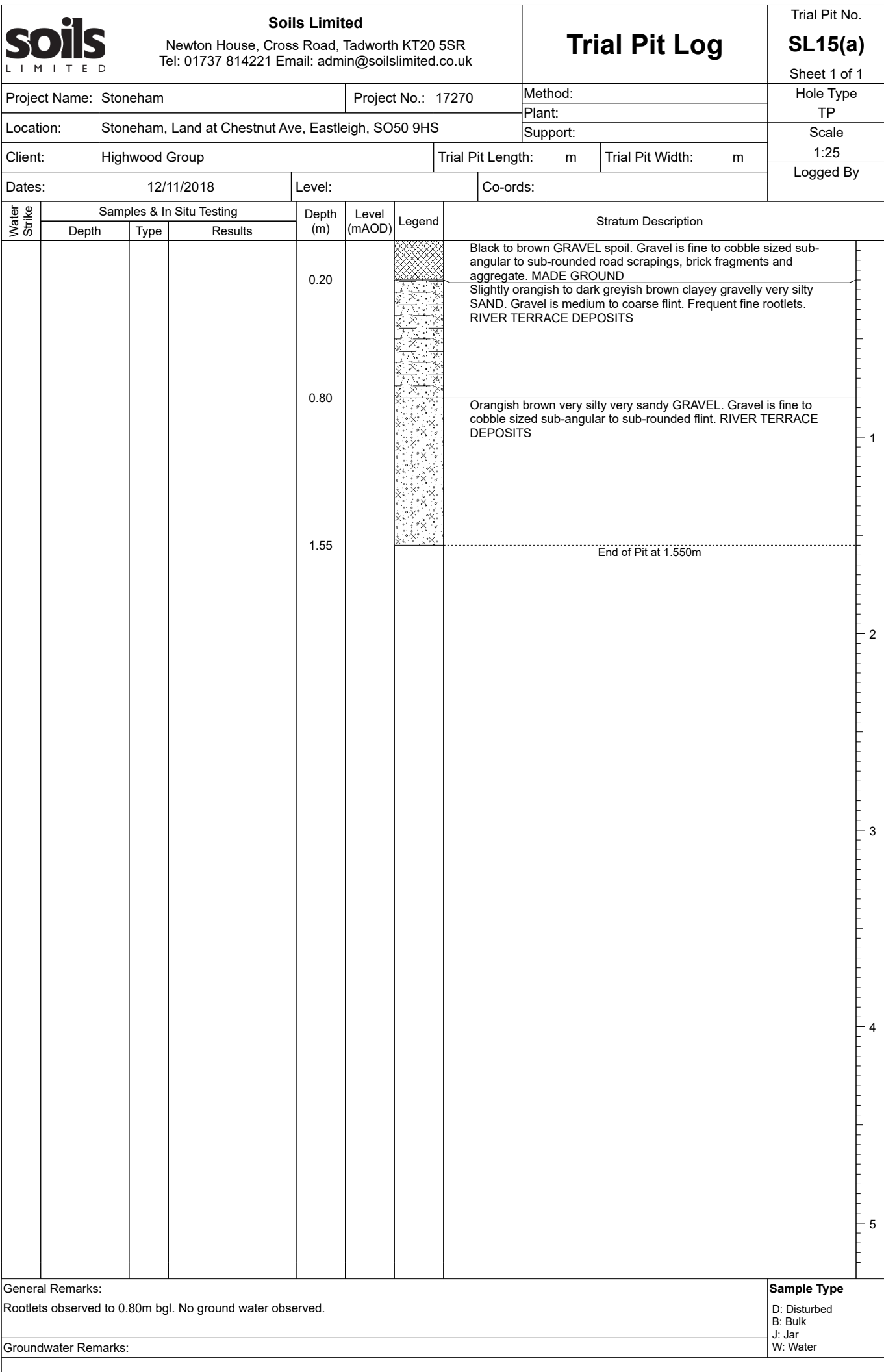
Client

Highwood Group

Reference

17270

		Soils Limited Newton House, Cross Road, Tadworth KT20 5SR Tel: 01737 814221 Email: admin@soilslimited.co.uk			Trial Pit Log		Trial Pit No. SL15 Sheet 1 of 1	
Project Name: Stoneham				Project No.: 17270		Method:		Hole Type TP
Location: Stoneham, Land at Chestnut Ave, Eastleigh, SO50 9HS						Plant:		
Client: Highwood Group				Trial Pit Length: m		Trial Pit Width: m		Scale 1:25
Dates: 12/11/2018				Level:		Co-ords:		Logged By
Water Strike	Samples & In Situ Testing			Depth (m)	Level (mAOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	D		0.20			Black to brown GRAVEL spoil. Gravel is fine to cobble sub-angular to sub-rounded road scrapings and aggregate. MADE GROUND	
	0.70	D		0.60			Slightly orangish brown clayey very silty SAND. Occasional medium to coarse flint gravel. Frequent fine rootlets. RIVER TERRACE DEPOSITS	
				1.50			Orangish brown very silty very sandy GRAVEL. Gravel is fine to cobble sized sub-angular to sub-rounded flint. RIVER TERRACE DEPOSITS	
						End of Pit at 1.500m		
General Remarks: Rootlets observed to 0.60m bgl. No ground water observed.								
Groundwater Remarks:								
Sample Type D: Disturbed B: Bulk J: Jar W: Water								



Soakaway Calculations

Soakaway Test No.	SL15 Test 1
Contract:	Land at Chestnut Avenue, Stoneham
Contract No.	17270

Field Test

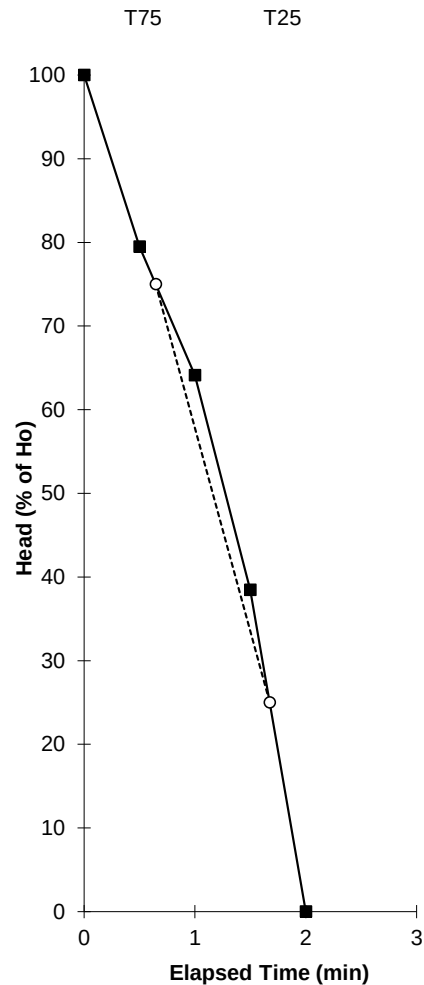
Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	1.50 m
Width of Pit	0.65 m
Length of Pit	1.10 m
Depth of Pit Soaked	0.39 m

ap50	1.3975 m ²
Vp75-25	0.139425 m ³
t75-25	1.0 min
water used	0.2789 m ³
f	1.616E-03 m/sec.

Field Data

Depth to	Elapsed	Head of	Head of
Water	Time	Water	Water
(m)	(min)	(% of Ho)	(m)
1.11	0	100	0.39
1.19	0.50	79	0.31
1.25	1.00	64	0.25
1.35	1.50	38	0.15
1.5	2.00	0	0.00



T75	0.646	75
T25	1.675	25
T75-25	1.029	Derived from Best Fit

Comments

Data extrapolated from 352 minutes in order to calculate infiltration rate. Data in red has been extrapolated.

SOILS LIMITED

Newton House, Cross Road, Tadworth
Surrey, KT20 5SR

Telephone: 01737 814 221
Facsimile: 01737 812 557

Soakaway Calculations

Soakaway Test No.	SL15 Test 2
Contract:	Land at Chestnut Avenue, Stoneham
Contract No.	17270

Field Test

Trial Pit Log (include details of groundwater):

See trial Pit record

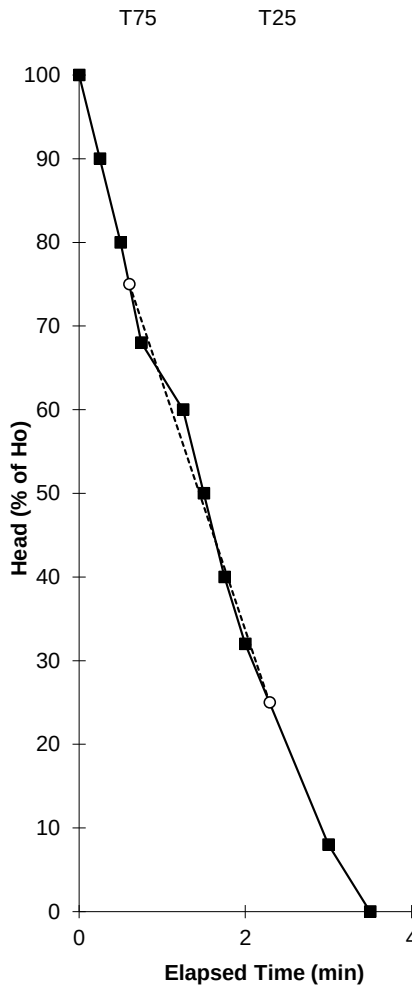
Depth of Pit	1.40 m
Width of Pit	0.65 m
Length of Pit	1.10 m
Depth of Pit Soaked	0.50 m

ap50	1.59 m2
Vp75-25	0.17875 m3
t75-25	1.7 min
water used	0.3575 m3
f	1.110E-03 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.9	0	100	0.50
0.95	0.25	90	0.45
1	0.50	80	0.40
1.06	0.75	68	0.34
1.1	1.25	60	0.30
1.15	1.50	50	0.25
1.2	1.75	40	0.20
1.24	2.00	32	0.16
1.36	3.00	8	0.04
1.4	3.50	0	0.00

T75	0.604	75
T25	2.292	25
T75-25	1.688	Derived from Best Fit



Comments

Data extrapolated from 305 minutes in order to calculate infiltration rate. Data in red has been extrapolated.

SOILS LIMITED

**Newton House, Cross Road, Tadworth
Surrey, KT20 5SR**

Telephone: 01737 814 221
Facsimile: 01737 812 557

Soakaway Calculations

Soakaway Test No.	SL15 Test 3
Contract:	Land at Chestnut Avenue, Stoneham
Contract No.	17270

Field Test

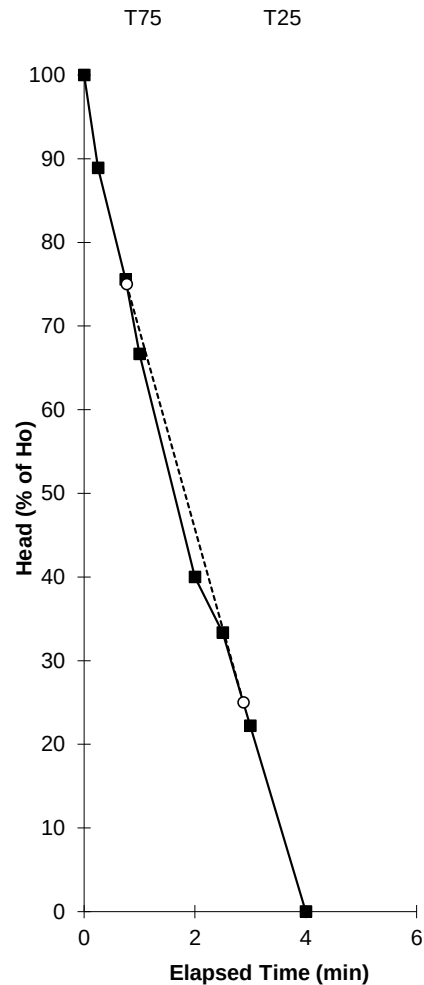
Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	1.40 m
Width of Pit	0.65 m
Length of Pit	1.10 m
Depth of Pit Soaked	0.45 m

ap50	1.5025 m ²
Vp75-25	0.160875 m ³
t75-25	2.1 min
water used	0.3218 m ³
f	8.460E-04 m/sec.

Field Data

Depth to Water (m)	Elapsed Time (min)	Head of Water (% of Ho)	Head of Water (m)
0.95	0	100	0.45
1	0.25	89	0.40
1.06	0.75	76	0.34
1.1	1.00	67	0.30
1.22	2.00	40	0.18
1.25	2.50	33	0.15
1.3	3.00	22	0.10
1.4	4.00	0	0.00



Comments

Infiltration rate too slow to be able to accurately extrapolate.

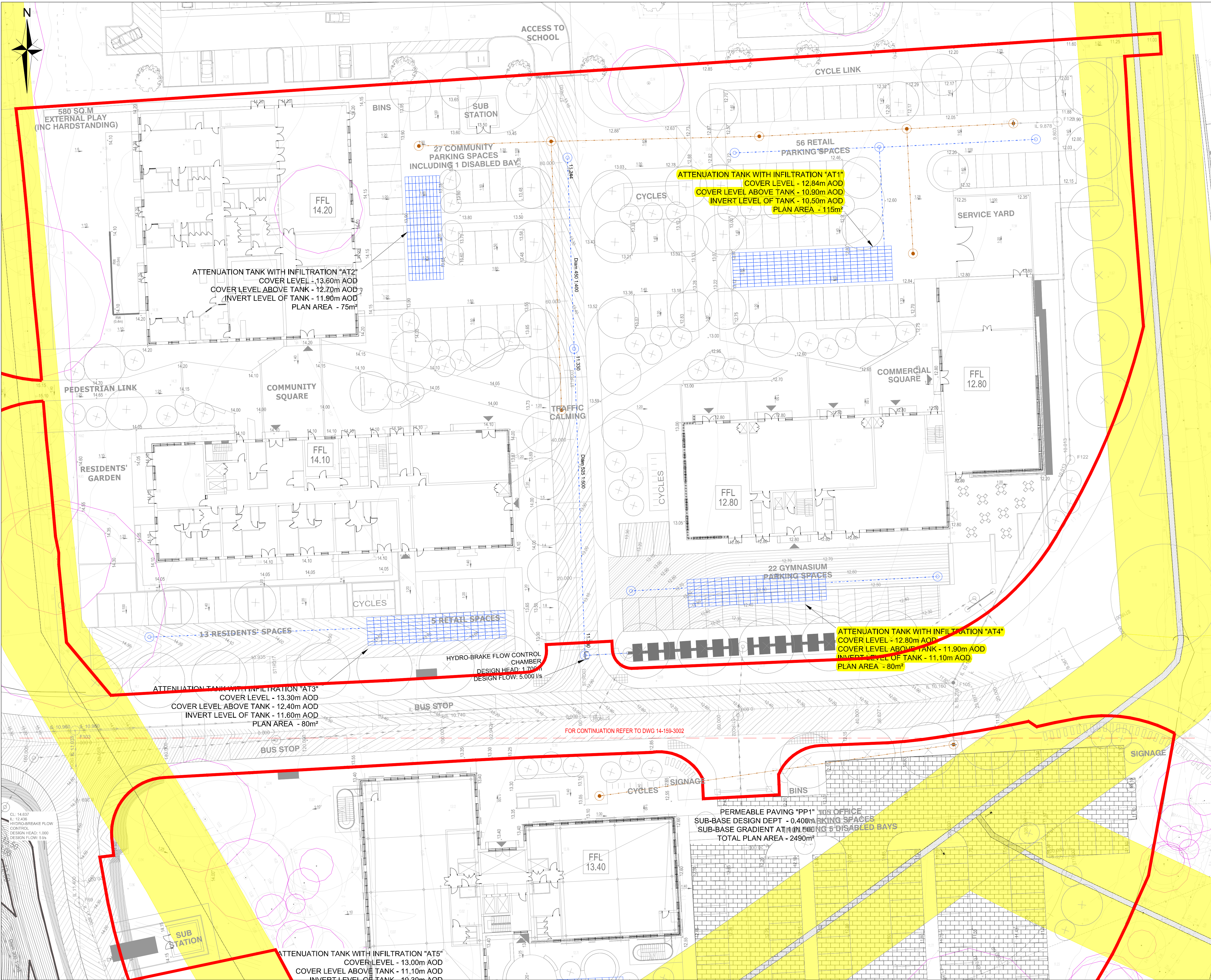
SOILS LIMITED

Newton House, Cross Road, Tadworth
Surrey, KT20 5SR

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Facsimile: 01737 812 557

APPENDIX C

PROPOSED LOCAL CENTRE DRAINAGE STRATEGY



- NOTES
1. ALL DIMENSIONS SHOWN IN METRES UNLESS NOTED OTHERWISE.
 2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT & ENGINEERING DETAILS, DRAWINGS & SPECIFICATIONS.
 3. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
 4. WHERE CONNECTIONS MADE TO EXISTING DRAINS INVOLVE REMOVAL OF PIPES OR CONNECTION OF PIPES, FLEXIBLE COUPLINGS SHOULD BE USED TO ENSURE A WATERTIGHT JOINT.
 5. PLEASE NOTE. ALL LOCATION OF EXISTING PRIVATE DRAINS, MANHOLES AND LEVELS ARE INDICATIVE ONLY. ACCURATE POSITION AND LEVELS OF DRAINS AND CHAMBERS TO BE DETERMINE ON SITE PRIOR TO WORK COMMENCEMENT.
 6. ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ONSITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS.
 7. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS PERMITTED WITHOUT PERMISSION FROM THE ENGINEER.
 8. THE CONTRACTOR MUST REFER TO THE EXISTING SERVICES PLANS AND INFORMATION AND MUST LOCATE EXISTING SERVICES PRIOR TO ANY EXCAVATIONS. ALL EXCAVATION WORKS IN THE VICINITY OF EXISTING SERVICES SHOULD BE CARRIED OUT IN ACCORDANCE WITH HSG47
 9. THE DRAINAGE ARRANGEMENTS ARE SUBJECT TO EVOLVE DURING THE DETAIL DESIGN STAGE OF THE PROJECT.

- LEGEND
- PROPOSED SURFACE WATER NETWORK
 - SURFACE WATER NETWORK UNDER SEPARATE APPLICATION
 - PROPOSED FOUL WATER NETWORK
 - FOUL WATER NETWORK UNDER SEPARATE APPLICATION
 - PROPOSED INFILTRATING ATTENUATION CELLULAR SOAKAWAY
 - PROPOSED PERMEABLE PAVING
 - ROOT PROTECTION AREA
 - TRACED LOCATION OF EXISTING SOUTHERN WATER WATER MAIN
 - EXISTING SOUTHERN WATER WATER MAIN EASEMENT

FOR PLANNING

A LAYOUT UPDATED	OC JHM/BAC 30.11.18
Rev Amendments	Dm Chk App Date

ODYSSEY

Odyssey House
Unit 3 Winchester Hill Business Park
Winchester Hill, Romsey
Southampton SO51 7UT

Telephone: 01256 331144
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E: enquiries@odysseymarkides.com
W: www.odysseymarkides.com

Job Title
STONEHAM, LAND AT CHESTNUT AVE. EASTLEIGH

Drawing Title
**PRELIMINARY DRAINAGE STRATEGY
LOCAL CENTRE SHEET 1 OF 2**

Client
HIGHWOOD CONSTRUCTION

Scale 1:250 @ A1	Date NOV 2018	Designed NT
Drawn NT	Checked BAC	Approved BAC
Job No 14-159	Drawing No 14-159-3001	Rev A

APPENDIX E

MICRODRAINAGE CALCULATIONS

Odyssey		Page 1																																																																																																																																																																																																																		
Tuscany House White Hart Lane Baskingstoke RG21 4AF	14-159 Local Centre, Stoneham Soakaway Tank 1																																																																																																																																																																																																																			
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Summary of Results for 100 year Return Period (+30%) Half Drain Time : 6 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>10.422</td><td>0.302</td><td>54.1</td><td>33.0</td><td>Flood Risk</td></tr><tr><td>30 min Summer</td><td>10.433</td><td>0.313</td><td>54.3</td><td>34.2</td><td>Flood Risk</td></tr><tr><td>60 min Summer</td><td>10.379</td><td>0.259</td><td>53.3</td><td>28.3</td><td>Flood Risk</td></tr><tr><td>120 min Summer</td><td>10.257</td><td>0.137</td><td>51.1</td><td>15.0</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>10.184</td><td>0.064</td><td>49.8</td><td>7.0</td><td>O K</td></tr><tr><td>240 min Summer</td><td>10.165</td><td>0.045</td><td>44.3</td><td>4.9</td><td>O K</td></tr><tr><td>360 min Summer</td><td>10.154</td><td>0.034</td><td>33.4</td><td>3.7</td><td>O K</td></tr><tr><td>480 min Summer</td><td>10.147</td><td>0.027</td><td>27.0</td><td>3.0</td><td>O K</td></tr><tr><td>600 min Summer</td><td>10.143</td><td>0.023</td><td>23.0</td><td>2.5</td><td>O K</td></tr><tr><td>720 min Summer</td><td>10.140</td><td>0.020</td><td>20.1</td><td>2.2</td><td>O K</td></tr><tr><td>960 min Summer</td><td>10.136</td><td>0.016</td><td>16.1</td><td>1.8</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>10.132</td><td>0.012</td><td>11.6</td><td>1.3</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>10.129</td><td>0.009</td><td>8.7</td><td>0.9</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>10.127</td><td>0.007</td><td>7.2</td><td>0.8</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>10.125</td><td>0.005</td><td>5.2</td><td>0.6</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>10.124</td><td>0.004</td><td>4.2</td><td>0.5</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>10.124</td><td>0.004</td><td>3.7</td><td>0.4</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>10.123</td><td>0.003</td><td>3.2</td><td>0.4</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>10.123</td><td>0.003</td><td>2.7</td><td>0.3</td><td>O K</td></tr><tr><td>15 min Winter</td><td>10.469</td><td>0.349</td><td>55.0</td><td>38.1</td><td>Flood Risk</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>122.433</td><td>0.0</td><td>13</td></tr><tr><td>30 min Summer</td><td>82.239</td><td>0.0</td><td>21</td></tr><tr><td>60 min Summer</td><td>52.662</td><td>0.0</td><td>38</td></tr><tr><td>120 min Summer</td><td>32.503</td><td>0.0</td><td>68</td></tr><tr><td>180 min Summer</td><td>24.118</td><td>0.0</td><td>96</td></tr><tr><td>240 min Summer</td><td>19.386</td><td>0.0</td><td>124</td></tr><tr><td>360 min Summer</td><td>14.268</td><td>0.0</td><td>184</td></tr><tr><td>480 min Summer</td><td>11.460</td><td>0.0</td><td>244</td></tr><tr><td>600 min Summer</td><td>9.659</td><td>0.0</td><td>306</td></tr><tr><td>720 min Summer</td><td>8.396</td><td>0.0</td><td>368</td></tr><tr><td>960 min Summer</td><td>6.724</td><td>0.0</td><td>488</td></tr><tr><td>1440 min Summer</td><td>4.907</td><td>0.0</td><td>734</td></tr><tr><td>2160 min Summer</td><td>3.573</td><td>0.0</td><td>1100</td></tr><tr><td>2880 min Summer</td><td>2.849</td><td>0.0</td><td>1464</td></tr><tr><td>4320 min Summer</td><td>2.067</td><td>0.0</td><td>2192</td></tr><tr><td>5760 min Summer</td><td>1.644</td><td>0.0</td><td>2960</td></tr><tr><td>7200 min Summer</td><td>1.377</td><td>0.0</td><td>3680</td></tr><tr><td>8640 min Summer</td><td>1.193</td><td>0.0</td><td>4488</td></tr><tr><td>10080 min Summer</td><td>1.056</td><td>0.0</td><td>5000</td></tr><tr><td>15 min Winter</td><td>122.433</td><td>0.0</td><td>14</td></tr></table>			Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	10.422	0.302	54.1	33.0	Flood Risk	30 min Summer	10.433	0.313	54.3	34.2	Flood Risk	60 min Summer	10.379	0.259	53.3	28.3	Flood Risk	120 min Summer	10.257	0.137	51.1	15.0	Flood Risk	180 min Summer	10.184	0.064	49.8	7.0	O K	240 min Summer	10.165	0.045	44.3	4.9	O K	360 min Summer	10.154	0.034	33.4	3.7	O K	480 min Summer	10.147	0.027	27.0	3.0	O K	600 min Summer	10.143	0.023	23.0	2.5	O K	720 min Summer	10.140	0.020	20.1	2.2	O K	960 min Summer	10.136	0.016	16.1	1.8	O K	1440 min Summer	10.132	0.012	11.6	1.3	O K	2160 min Summer	10.129	0.009	8.7	0.9	O K	2880 min Summer	10.127	0.007	7.2	0.8	O K	4320 min Summer	10.125	0.005	5.2	0.6	O K	5760 min Summer	10.124	0.004	4.2	0.5	O K	7200 min Summer	10.124	0.004	3.7	0.4	O K	8640 min Summer	10.123	0.003	3.2	0.4	O K	10080 min Summer	10.123	0.003	2.7	0.3	O K	15 min Winter	10.469	0.349	55.0	38.1	Flood Risk	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	122.433	0.0	13	30 min Summer	82.239	0.0	21	60 min Summer	52.662	0.0	38	120 min Summer	32.503	0.0	68	180 min Summer	24.118	0.0	96	240 min Summer	19.386	0.0	124	360 min Summer	14.268	0.0	184	480 min Summer	11.460	0.0	244	600 min Summer	9.659	0.0	306	720 min Summer	8.396	0.0	368	960 min Summer	6.724	0.0	488	1440 min Summer	4.907	0.0	734	2160 min Summer	3.573	0.0	1100	2880 min Summer	2.849	0.0	1464	4320 min Summer	2.067	0.0	2192	5760 min Summer	1.644	0.0	2960	7200 min Summer	1.377	0.0	3680	8640 min Summer	1.193	0.0	4488	10080 min Summer	1.056	0.0	5000	15 min Winter	122.433	0.0	14
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Odyssey			Page 2		
Tuscany House White Hart Lane Baskingstoke RG21 4AF		14-159 Local Centre, Stoneham Soakaway Tank 1			
Date 20/11/2018 File 14-159 LOCAL CENTRE TAN...		Designed by NT Checked by BAC			
XP Solutions		Source Control 2018.1.1			
Summary of Results for 100 year Return Period (+30%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	10.465	0.345	54.9	37.7	Flood Risk
60 min Winter	10.366	0.246	53.1	26.9	Flood Risk
120 min Winter	10.191	0.071	49.9	7.8	O K
180 min Winter	10.161	0.041	40.9	4.5	O K
240 min Winter	10.153	0.033	33.0	3.6	O K
360 min Winter	10.145	0.025	24.5	2.7	O K
480 min Winter	10.140	0.020	19.6	2.1	O K
600 min Winter	10.137	0.017	16.6	1.8	O K
720 min Winter	10.135	0.015	14.6	1.6	O K
960 min Winter	10.132	0.012	11.6	1.3	O K
1440 min Winter	10.129	0.009	8.7	0.9	O K
2160 min Winter	10.126	0.006	6.2	0.7	O K
2880 min Winter	10.125	0.005	5.2	0.6	O K
4320 min Winter	10.124	0.004	3.7	0.4	O K
5760 min Winter	10.123	0.003	3.2	0.4	O K
7200 min Winter	10.123	0.003	2.7	0.3	O K
8640 min Winter	10.122	0.002	2.2	0.3	O K
10080 min Winter	10.122	0.002	2.2	0.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	82.239	0.0	23		
60 min Winter	52.662	0.0	40		
120 min Winter	32.503	0.0	68		
180 min Winter	24.118	0.0	94		
240 min Winter	19.386	0.0	124		
360 min Winter	14.268	0.0	184		
480 min Winter	11.460	0.0	238		
600 min Winter	9.659	0.0	300		
720 min Winter	8.396	0.0	366		
960 min Winter	6.724	0.0	492		
1440 min Winter	4.907	0.0	728		
2160 min Winter	3.573	0.0	1092		
2880 min Winter	2.849	0.0	1524		
4320 min Winter	2.067	0.0	2184		
5760 min Winter	1.644	0.0	2840		
7200 min Winter	1.377	0.0	3640		
8640 min Winter	1.193	0.0	4256		
10080 min Winter	1.056	0.0	4872		
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Odyssey		Page 3												
Tuscany House White Hart Lane Baskingstoke RG21 4AF	14-159 Local Centre, Stoneham Soakaway Tank 1													
Date 20/11/2018 File 14-159 LOCAL CENTRE TAN...	Designed by NT Checked by BAC													
XP SolutionsSource Control 2018.1.1														
Model Details Storage is Online Cover Level (m) 10.520 Cellular Storage Structure Invert Level (m) 10.120 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 3.04560 Porosity 0.95 Infiltration Coefficient Side (m/hr) 3.04560 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>115.0</td><td>115.0</td><td>0.400</td><td>115.0</td><td>132.2</td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	115.0	115.0	0.400	115.0	132.2
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)									
0.000	115.0	115.0	0.400	115.0	132.2									
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Odyssey					Page 1
Tuscany House White Hart Lane Baskingstoke RG21 4AF		14-159 Local Centre, Stoneham Soakaway Tank 4			
Date 20/11/2018 File 14-159 LOCAL CENTRE TAN...		Designed by NT Checked by BAC			
XP Solutions		Source Control 2018.1.1			
Summary of Results for 100 year Return Period (+30%)					
Half Drain Time : 80 minutes.					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	11.644	0.144	2.0	10.9	Flood Risk
30 min Summer	11.682	0.182	2.1	13.9	Flood Risk
60 min Summer	11.707	0.207	2.1	15.8	Flood Risk
120 min Summer	11.714	0.214	2.1	16.2	Flood Risk
180 min Summer	11.706	0.206	2.1	15.7	Flood Risk
240 min Summer	11.695	0.195	2.1	14.8	Flood Risk
360 min Summer	11.672	0.172	2.1	13.1	Flood Risk
480 min Summer	11.650	0.150	2.1	11.4	Flood Risk
600 min Summer	11.630	0.130	2.0	9.9	Flood Risk
720 min Summer	11.612	0.112	2.0	8.5	Flood Risk
960 min Summer	11.583	0.083	2.0	6.3	O K
1440 min Summer	11.550	0.050	2.0	3.8	O K
2160 min Summer	11.538	0.038	1.5	2.9	O K
2880 min Summer	11.531	0.031	1.2	2.4	O K
4320 min Summer	11.523	0.023	0.9	1.7	O K
5760 min Summer	11.518	0.018	0.7	1.4	O K
7200 min Summer	11.516	0.016	0.6	1.2	O K
8640 min Summer	11.513	0.013	0.5	1.0	O K
10080 min Summer	11.512	0.012	0.5	0.9	O K
15 min Winter	11.663	0.163	2.1	12.4	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
15 min Summer	122.433	0.0	17		
30 min Summer	82.239	0.0	31		
60 min Summer	52.662	0.0	58		
120 min Summer	32.503	0.0	90		
180 min Summer	24.118	0.0	124		
240 min Summer	19.386	0.0	158		
360 min Summer	14.268	0.0	226		
480 min Summer	11.460	0.0	290		
600 min Summer	9.659	0.0	354		
720 min Summer	8.396	0.0	414		
960 min Summer	6.724	0.0	530		
1440 min Summer	4.907	0.0	748		
2160 min Summer	3.573	0.0	1104		
2880 min Summer	2.849	0.0	1468		
4320 min Summer	2.067	0.0	2200		
5760 min Summer	1.644	0.0	2936		
7200 min Summer	1.377	0.0	3664		
8640 min Summer	1.193	0.0	4408		
10080 min Summer	1.056	0.0	5136		
15 min Winter	122.433	0.0	17		
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Odyssey			Page 2		
Tuscany House White Hart Lane Baskingstoke RG21 4AF		14-159 Local Centre, Stoneham Soakaway Tank 4			
Date 20/11/2018 File 14-159 LOCAL CENTRE TAN...		Designed by NT Checked by BAC			
XP Solutions		Source Control 2018.1.1			
Summary of Results for 100 year Return Period (+30%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	11.708	0.208	2.1	15.8	Flood Risk
60 min Winter	11.739	0.239	2.1	18.2	Flood Risk
120 min Winter	11.745	0.245	2.1	18.6	Flood Risk
180 min Winter	11.733	0.233	2.1	17.7	Flood Risk
240 min Winter	11.716	0.216	2.1	16.4	Flood Risk
360 min Winter	11.680	0.180	2.1	13.7	Flood Risk
480 min Winter	11.646	0.146	2.0	11.1	Flood Risk
600 min Winter	11.616	0.116	2.0	8.8	Flood Risk
720 min Winter	11.590	0.090	2.0	6.8	O K
960 min Winter	11.554	0.054	2.0	4.1	O K
1440 min Winter	11.539	0.039	1.5	3.0	O K
2160 min Winter	11.529	0.029	1.1	2.2	O K
2880 min Winter	11.523	0.023	0.9	1.7	O K
4320 min Winter	11.517	0.017	0.7	1.3	O K
5760 min Winter	11.513	0.013	0.5	1.0	O K
7200 min Winter	11.511	0.011	0.4	0.8	O K
8640 min Winter	11.510	0.010	0.4	0.7	O K
10080 min Winter	11.509	0.009	0.3	0.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	82.239	0.0	31		
60 min Winter	52.662	0.0	58		
120 min Winter	32.503	0.0	96		
180 min Winter	24.118	0.0	134		
240 min Winter	19.386	0.0	172		
360 min Winter	14.268	0.0	244		
480 min Winter	11.460	0.0	310		
600 min Winter	9.659	0.0	372		
720 min Winter	8.396	0.0	428		
960 min Winter	6.724	0.0	522		
1440 min Winter	4.907	0.0	752		
2160 min Winter	3.573	0.0	1104		
2880 min Winter	2.849	0.0	1468		
4320 min Winter	2.067	0.0	2208		
5760 min Winter	1.644	0.0	2936		
7200 min Winter	1.377	0.0	3576		
8640 min Winter	1.193	0.0	4400		
10080 min Winter	1.056	0.0	5088		
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Odyssey		Page 3
Tuscany House White Hart Lane Basingstoke RG21 4AF	14-159 Local Centre, Stoneham Soakaway Tank 4	
Date 20/11/2018 File 14-159 LOCAL CENTRE TAN...	Designed by NT Checked by BAC	
XP Solutions Source Control 2018.1.1		

Model Details

Storage is Online Cover Level (m) 11.900

Cellular Storage Structure

Invert Level (m) 11.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) **0.17316** Porosity 0.95
Infiltration Coefficient Side (m/hr) **0.17316**

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	80.0	80.0	0.400	80.0	94.3

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