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flood risk assessment

Land at Christy's Lane, Shaftesbury

Flood Risk Assessment

Project No.	1552
Revision	B
Date	17th August 2023
Client	Planning Issues Ltd
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Checked	L Blackmore
Authorised	C Yalden
File Ref.	**p:\1552 land at christy's lane, shaftesbury\c documents\reports\1552 - land at christy's lane, shaftesbury - flood risk assessment.docx**

1 Introduction

Introduction & Background

1.1 Awcock Ward Partnership has been commissioned by Planning Issues Ltd to prepare a Flood Risk Assessment in support of a full planning application for the proposed development of Land at Christy's Lane, Shaftesbury, Dorset, SP7 8TL.

1.2 The proposed retirement living scheme comprises 27 one-bedroom and 14 two-bedroom apartments, together with associated access, parking and amenity space.

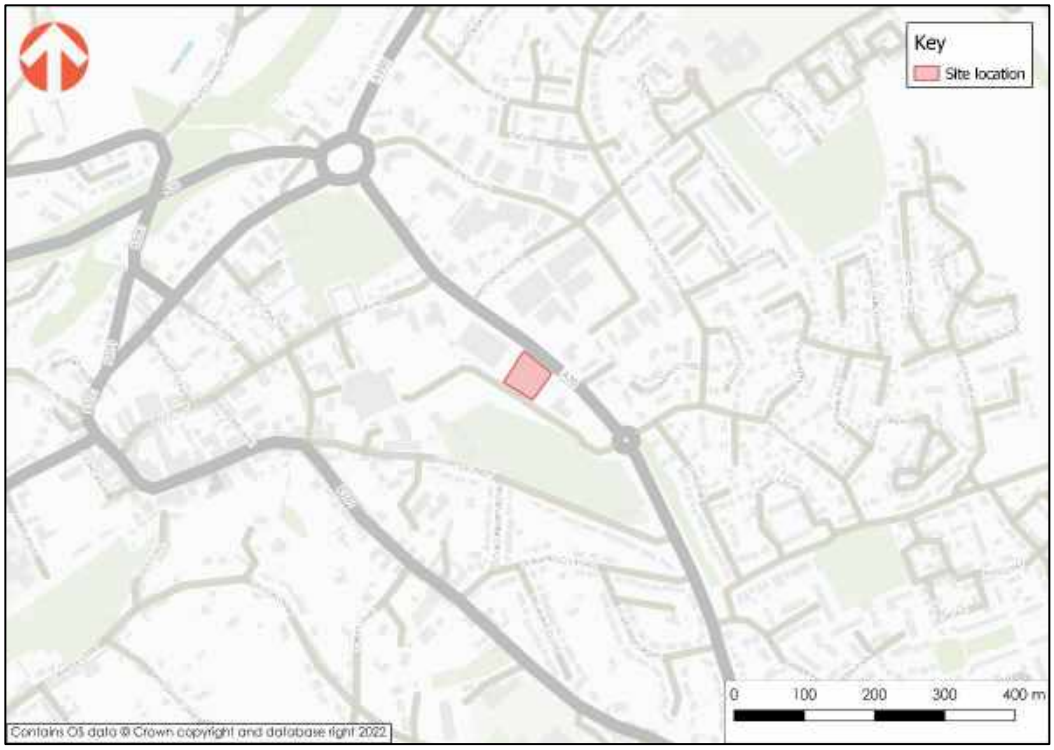
1.3 The development is in the location of a former Cattle Market, bordered by Christy's Lane to the north and northeast; an existing supermarket access road and filling station (Tesco) to the south and southeast; and a recently constructed Lidl store access road and car park to the west.

1.4 The proposed site is within an area of predominantly commercial properties, with residential dwellings to the east and recreational grounds to the south.

1.5 The site will gain access from the Lidl store access road, which forms the western site boundary.

1.6 The location of the site in relation to its surroundings can be seen within Figure 1.1.

Figure 1.1 – Site Location Plan



1.7 This Technical Note has been prepared in accordance with the National Planning Policy Framework (NPPF) and Planning Policy Guidance - Flood Risk and Coastal Change guidance; and national drainage guidance (CIRIA C753 – The SuDS Manual).

1.8 This document sets out the existing baseline conditions in Section 2 and the development proposal in Section 3. The proposed surface water management plan and foul water strategy that will serve the development is discussed in Sections 4 and 5 respectively, with Section 6 providing the ownership and maintenance information before concluding in Section 7.

2 Existing Baseline Conditions

Existing Site

2.1 The existing site comprises brownfield land which lies parallel with the A350 (known locally as Christy's Lane) and sits adjacent the access road and customer car park for the recently completed Lidl supermarket.

2.2 Based on the topographic survey provided, it can be concluded that the site has an average gradient of approximately 1 in 40 from north to south, with the highest point at 219.09 mAOD in the northern corner and the lowest point at 217.12 mAOD in the southern corner.

2.3 The site is constrained by existing trees and Root Protection Areas (RPA's) along its northern and eastern boundaries. These tree constraints must be considered by the proposed surface water management plan and any future stages of design.

2.4 The topographical survey is included in Appendix A, with a copy of the arboricultural constraints plan included in Appendix B.

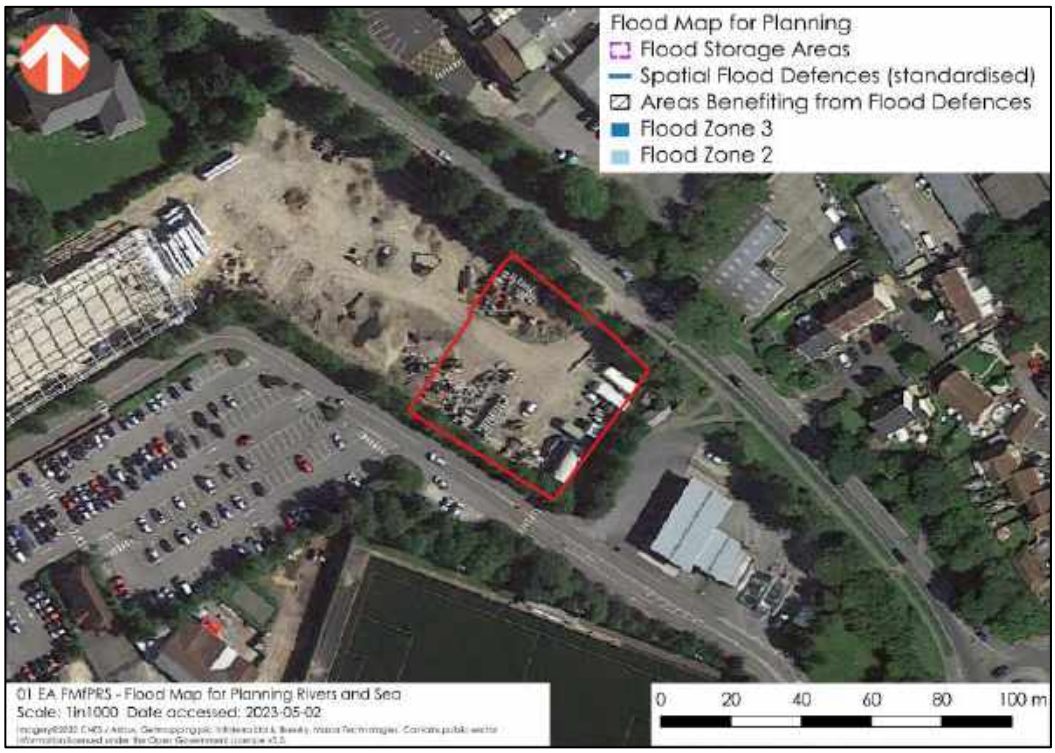
Existing Flood Risk

2.5 We have carried out a desktop assessment of potential flood risks to the site using the Environment Agency's (EA) Flood Information Service.

Fluvial sources (River/Sea flooding)

2.6 An extract of the 'Flood Map for Planning' has been reproduced as Figure 2.1 and shows the site as being within 'Flood Zone 1', with less than 1 in 1,000 annual exceedance probability (AEP) of river or sea flooding (<0.1%).

Figure 2.1– EA Flood Map for Planning



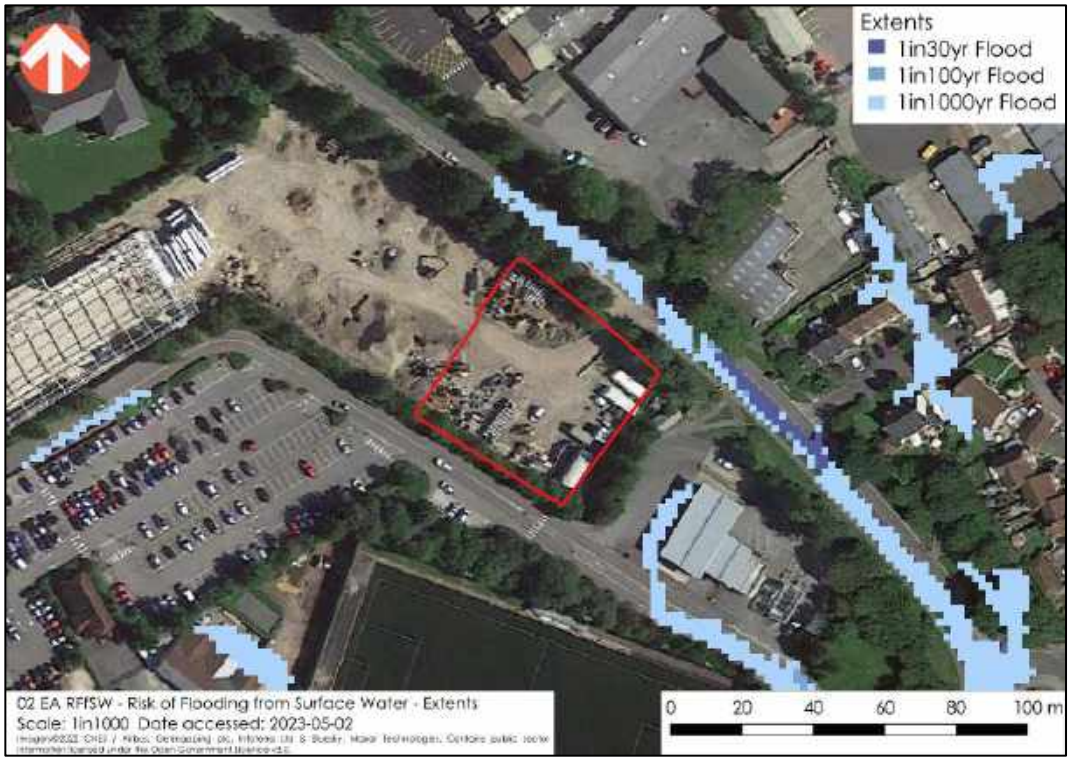
2.7 Figure 2.1 shows the full extent of the residential development and surrounding areas, including roads, to be within Flood Zone 1, with a 'low risk' of fluvial flooding (<0.1% AEP).

2.8 The site is not within a Critical Drainage Area (CDA).

Pluvial sources (surface water flooding)

2.9 The EA's 'Flooding from Surface Water' map has been reproduced as Figure 2.2 and shows the site at 'very low risk' of flooding from surface water (less than 0.1% annual exceedance probability, AEP). The mapping is based on LiDAR data and indicates the typical conveyance routes of surface water runoff.

Figure 2.2 – EA Flooding from surface water (low risk, <0.1%)



2.10 Depth of surface water flooding in Christy's lane, in line with the Lidl store access junction, remains less than 150mm and will not prevent access and egress to the site.

Artificial sources

2.11 The proposed development is not located downstream of any reservoirs or other artificial sources (i.e., canals, mining operations etc.).

Groundwater sources

2.12 The site does not lie within a groundwater flood warning area.

2.13 Based on the EA long term flood risk information (online), flooding from groundwater is unlikely in this area.

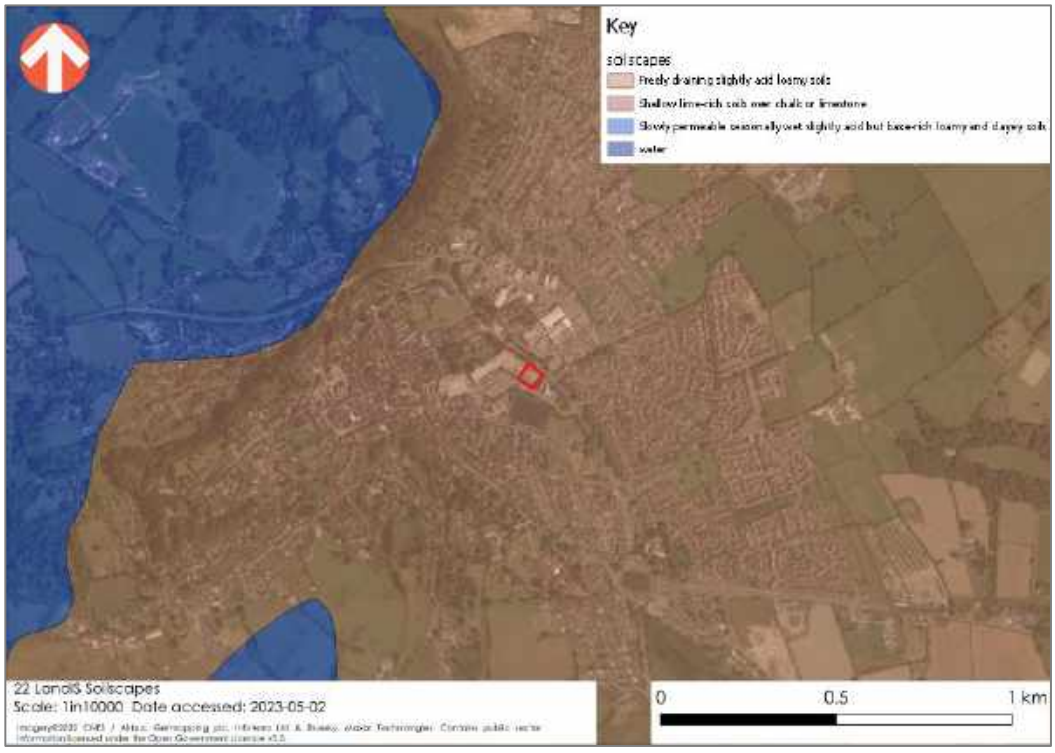
Flood Risk Summary

2.14 The site is located within Flood Zone 1 and is not susceptible to surface water flooding or any other sources of flooding. Furthermore, the site does not lie within a CDA.

Ground Conditions

2.15 The site is located within an area with soils described by the Soilscape dataset as "freely draining slightly acid loamy soils" as seen in Figure 2.3.

Figure 2.3 – Soilscape mapping



2.16 A Ground Investigation (GI) was also completed by Crossfield Consulting in May 2023.

2.17 The GI concluded that Made Ground was present on the site, with depths typically ranging 0.6m-1.4m and comprising gravels over silty clays. No buried foundations or similars structures were encountered during the on-site investigations. Underneath the Made Ground lies Boyne Hollow Chert

Member strata; medium to high strength gravelly clays, and medium dense to desne clayey sands and gravels.

2.18 Groundwater was not encountered within any of the testing locations. The GI states that "*groundwater is indicated at depths in excess of 5m; well record data indicates groundwater may be located in excess of 30m depth" (Crossfield Consulting, May 2023)*.

2.19 The Ground Investigation also found that there is currently '*no unacceptable level of risk to human health or groundwater resources'* from contaminant linkages.

2.20 As part of the GI, Crossfield progressed testing in line with BRE Digest 365. The testing comprised two separate trial pit locations (TP1 and TP2), with depths of 1.8m and 2.0m respectively, within weathered Boyne Hollow Chert Formation stata (gravelly sand/sandy gravels with some siltly clay pockets/inclusions). The infiltration rates are summarised in Table 2.1, with extracts from the GI report included in Appendix C.

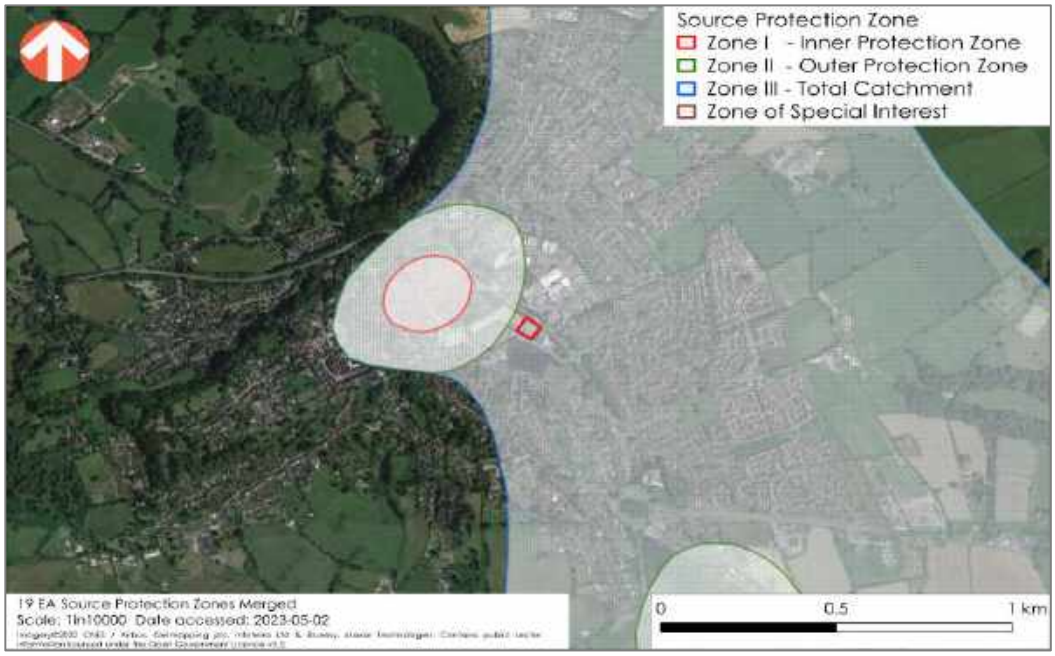
Table 2.1 – Infiltration testing results

Test ID	Test number	Infiltration Rate (m/s)	Design Rate (m/s)
TP1	1	2 x 10-5	2 x 10-5
	2	4 x 10-5	
	3	*2 x 10-5	
TP2	1	3 x 10-5	3 x 10-5
	2	4 x 10-5	
	3	3 x 10-5	

*estimated value

2.21 The site lies within Source Protection Zone III as seen in Figure 2.4 overleaf. The site's location within Zone III (total catchment) is relatively close to a groundwater abstraction site (Zone I).

Figure 2.4 – Source Protection Zones



2.22 Based on a risk assessment conducted by Crossfield Consulting (Ground Investigation Report, May 2023) they concluded that "*no valid contaminant linkage is indicated in relation to Controlled Waters and no development constraints were identified in this context. On this basis, groundwater protection issues should not preclude the use of soakaway drainage systems*".

2.23 The existing ground conditions support the use of infiltration drainage. In line with the approved drainage hierarchy, use of soakaways should be prioritised within this site; this will also improve groundwater recharge compared to the existing brownfield site, which serves to benefit the downstream abstraction.

Existing Site Drainage

2.24 A CCTV survey, carried out by Utility Surveys Ltd (April 2023), identifies a foul sewer passing through the northern extents of the site, from west to east.

2.25 The private foul sewer receives foul flows from the Lidl supermarket and additional CCTV Survey (Utility Surveys Ltd May 2023) confirmed that it continues east towards a connection with the Wessex Water (WW) network in Christy's Lane, to the southeast of the site (identified point of connection as MH9001).

2.26 The section of private foul sewer within the site has a recorded diameter of 225mm, reducing to 150mm as it exits the eastern site boundary and

continues past the Tesco filling station, towards it's point of connection on the adopted network.

2.27 At the time of the October 2011 Private Sewer Transfer regulations the application site was within the same ownership as the land now occupied by Lidl, and the Tesco Filling Station, and therefore this existing private foul sewer was not transferred to WW as an adoptable asset – it remains private.

2.28 The additional CCTV survey (Utility Surveys Ltd May 2023) confirms that the off-site section of private foul sewer also receives connections from the Tesco Filling station and Car Wash facilities.

2.29 Copies of the final CCTV survey can be found within Appendix D.

2.30 The WW records, identify a 150mm diameter adopted foul sewer on the northern side of Christy's Lane and a 225mm diameter highway drain within the nearside footway of Christy's Lane, immediately north of the site. There are no nearby WW adopted surface water sewers in the area.

2.31 An extract of the WW mapping can be seen in Figure 2.5, with a full copy of the local asset records and correspondence included in Appendix E.

Figure 2.5 – WW Sewer Record Mapping

2.32 The topographic survey and CCTV drainage report (April and May 2023) identify a 600mm diameter storm drain within the nearside footway of Christy's Lane, laid parallel to the 225mm highway drain. This over-sized sewer was used to attenuate flows within the highway drain, providing capacity for an additional in-flow from the Lidl store.

2.33 Copies of the CCTV survey report are included in Appendix D with WW sewer records and correspondence provided in Appendix E.

Existing surface water runoff

2.34 Runoff from the existing brownfield site will accumulate towards the southern and eastern boundaries of the site, where it would be intercepted by two open pits, at 1.92m depth. The outlets from the pits were recorded as being blocked/abandoned – possibly intersected by the existing private foul drain. Brownfield runoff is therefore expected to drain to ground, with any residual flow continuing overland, beyond the eastern and southern boundaries.

2.35 In line with best practice, re-development of brownfield sites should seek to limit peak flows to the equivalent greenfield rates. The equivalent greenfield rates for the site (0.252ha) have been calculated using the FEH methodology, with the results summarised within Table 2.2 below and the calculation sheet, for a unit area (1ha), included within Appendix F of this report.

Table 2.1 – Equivalent Greenfield Runoff Rates

Return Period	Greenfield rate per nit area (l/s/ha)	Greenfield Rate (l/s) (net dev: 0.252ha)
2 year	3.1	0.8
30 years	8.0	2.0
100 years	11.2	2.8

2.36 If runoff is attenuated and discharged at the equivalent greenfield runoff rates, peak flows would need to be limited to the equivalent greenfield rates as far as is reasonably practicable, without increased risk of blockage due to under-sized controls.

3 Development Proposal

3.1 The development proposes to construction a new apartment building which comprises 27 one-bedroom and 14 two-bedroom apartments, together with associated access, parking and amenity space.

3.2 A copy of the proposed site layout has been included within Appendix G.

Vulnerability

3.3 In accordance with the NPPF Annex 3: flood risk vulnerability classification, residential development is considered to be "More Vulnerable".

3.4 The Planning Practice Guidance indicates that "more vulnerable" development is appropriate within Flood Zone 1, and that the site would pass the Sequential Test, which aims to steer development to the lowest category of flooding (Flood Zone 1).

3.5 The proposed site gains access from Christy's Lane, which remains in Flood Zone 1 and is only susceptible to less than 150mm depth of flooding in the low risk event, with 1 in 1,000 year AEP. It is therefore considered that safe access and egress can be afforded to Christy's Lane throughout the developments lifetime.

Drainage requirements

3.6 'CIRIA C753 – The SuDS Manual' advises that surface water disposal should be to be prioritised in the following order:

- Infiltration.
- Discharge to surface waters.
- Discharge to a surface water sewer, highway drain or other drainage system.
- Discharge to a combined sewer.

3.7 As required by the NPPF, the drainage strategy must demonstrate that the development will be safe throughout its lifetime, without increasing flood risk elsewhere, whilst also taking account of the impacts of climate change.

Climate change impacts

3.8 Climate change allowances for peak rainfall in England is published online by the Department for Environment, Food and Rural Affairs. The 'Dorset Management Catchment peak rainfall allowances' (https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall?mgmtcatid=3030, online) are summarised in Table 3.1 below. The climate recommendations provide for developments with a lifetime up to 2125 (epoch 2070s).

Table 3.1 – Peak rainfall allowance

Allowance category	Epoch	Central allowance	Upper end allowance
3.3% annual exceedance rainfall event	2050s	20%	35%
	2070s	25%	40%
1% annual exceedance rainfall event	2050s	25%	40%
	2070s	25%	45%

3.9 The 50th percentile (central allowance) is the point at which half of the possible scenarios for peak rainfall fall below it. The upper end allowance is based on the 95% percentile, thus only 5% of possible scenarios fall above an allowance level.

3.10 The attenuation for the proposed development has been sized to accommodate runoff from the development up to the 1 in 100 year return period storm, with 45% upper end peak rainfall climate change allowance as further discussed in Section 4.

4 Surface Water Management Plan

4.1 The site is less than 1ha and within Flood Zone 1.

4.2 To ensure the development is safe throughout its lifetime, the surface water strategy accounts for runoff in up to the 100 year return period.

4.3 The strategy also safeguards against the upper end allowances for climate change (45%) as stipulated for the *Dorset Management Catchment*, providing betterment over existing conditions, where the rate and volume of runoff would continue to increase due to climate change.

4.4 The Ground Investigation concluded that infiltration rates are sufficient to support the use of soakaways and groundwater is considered to be at depth. The use of soakaways is therefore prioritised in line with the drainage hierarchy.

4.5 Runoff from the site and proposed building will be intercepted and drained towards a new cellular soakaway beneath the parking court to the south-west of the building.

4.6 The cellular soakaway is proposed within the parking area inside the western extents of the site, outside any RPA constraints and with minimum 5m easement from any existing or new building foundations. The soakaway will be located at 2mBGL in line with the depth of testing and will comprise 0.8m soakaway structure and 1.2m depth of cover.

4.7 All chambers immediately upstream of the cellular soakaway will include silt traps, whilst the soakaway itself will include vented covers or a high-level vent pipe to mitigate air-locks.

4.8 Causeway Flow has been used to determine the size of the cellular soakaway to serve the development, based on the nearest test pit (TP2), with a Factor of Safety of 3, in line with CIRIA C753. The attenuation requirement can be seen summarised within Table 4.1, with copies of the modelling outputs included within Appendix H.

Table 4.1 – Attenuation Volumes

Attenuation Feature	Attenuation Volume (100yr +45% climate change)
Cellular Soakaway	96.4m³
TOTAL	**96.4m³**

4.9 The proposed surface water management plan will reduce the peak rates and volumes of runoff compared to baseline conditions and will also offer a significantly reduced pollution hazard compared to the sites previous use as a cattle market.

4.10 A copy of the preliminary drainage layout can be found on drawing 1552-01-PDL-1001 included within Appendix I.

Long Term Storage

4.11 The proposed development offers a reduced drainage catchment, with all runoff being drained to ground and therefore further consideration of long term storage (LTS) is not required.

Exceedance Measures

4.12 Beyond the 100-year critical storm exceedance runoff will be directed to exceedance paths, away from the building, towards any residual areas of open space and/or car parking, where aboveground storage can be used.

4.13 Beyond the limits of the site, exceedance flows would continue to the natural low points along the southern and eastern boundaries of the site, reflecting existing conditions but with a reduced exceedance rate and volume.

5 Foul Water Strategy

5.1 Foul flows generated by the proposed development will be served by a new private gravity network and will discharge into the existing private foul sewer which connects to the Wessex Water (WW) network within Christy's Lane (at MH9001).

5.2 The section of private foul sewer crossing the site will be diverted to accommodate the proposed development.

5.3 The private foul sewer originates from, and serves, the Lidl superstore to the west of the site before crossing the site and continuing southeast past the Tesco filling station and car wash facilities. The CCTV survey (May 2023) confirmed a connection from the Tesco filling station and Car Wash to the private sewer prior to discharge to the WW public foul sewer.

5.4 The existing foul flow from the Lidl supermarket and Tesco Filling station have been assessed based on average flow predicted by the Foul Sewer Design Flow (Surveyor datafile, January 1992) (300 litres/day/100m^2), and the British Water – Code of Practice – Flows and Loads 4 respectively (90 litres/day/employee). It is assumed that the Tesco Filling station has three full-time day staff, and the supermarket area has been measured from as-built drawings.

5.5 Existing flow from the Tesco Car Wash facility has been estimated based on predicted water use for the Auto Car Wash and Lance Bay. Calculation of the flow rate for each is provided in Table 5.1 below.

Table 5.1 – Tesco Car Wash facility predicted flows to private foul sewer

Car Wash Facilities	Flow Calculations
Auto Car Wash	150 litres per car 3 min wash period 50 litres/min 0.83 l/s avg.
Lance Bay	100 Bar pressure washer typical flow 12 litres/minute 0.2 l/s avg.
Total	**1.03 l/s**

5.6 The projected foul sewage flow from the proposed retirement apartments have been assessed based on average flow predicted by the British Water – Code of Practice – Flows and Loads 4 (350 litres/day/person).

5.7 The expected occupancy (persons) for the apartments is based on the occupancy rates of similar, existing developments with average

occupancy rate of 1.18 and 1.47 persons per one-and two-bedroom apartments respectively.

5.8 The projected foul sewage flows are summarised in Table 5.2 with the calculation sheet included in Appendix J.

Table 5.2 – Summary of projected foul sewage flows

Development	Peak flow rate (l/s)
Proposed retirement apartments	1.417
Lidl Superstore	0.611
Tesco Filling Station	0.055
Tesco Car wash	1.030
Total	**3.113**

5.9 The pipe capacity of the private foul sewer has been assessed as 12.6l/s using the Colebrook White Equation (HR Wallingford, 1990) for the 150mm diameter foul sewer at a minimum grade of 1 in 150. The calculation sheet is included in Appendix J.

5.10 It is concluded that the private foul sewer has sufficient capacity to serve the proposed development, with total future peak flow rate of 3.113l/s being significantly less than the available pipe capacity of 12.6l/s.

5.11 In terms of wastewater connections, the developer is entitled to make a connection to the nearest practical point on the network where the existing sewer is at least the same diameter as the new sewer required to provide capacity for the development.

5.12 Under the provisions of the Water Industry Act 1992 (as amended), the developer will need to pay the sewerage undertaker the published sewer connection charges and infrastructure charge per dwelling, and the sewerage undertaker is responsible for any network reinforcement.

5.13 We propose to discharge foul to the public foul sewer on Christy's Lane via the existing private foul connection at MH9001.

5.14 A foul capacity enquiry was submitted to WW. WW has confirmed that "capacity is available to accommodate the foul flows from the proposed development, the nearest public foul sewer of suitable diameter or greater is the 225mm diameter located on Christy's Lane."

5.15 The proposed foul drainage arrangements can be seen on the preliminary drainage layout drawing 1552-01-PDL-1001 within Appendix I. The pre-application consultation response from WW is included in Appendix E.

6 Ownership & Maintenance

6.1 All on-site piped drainage will remain private and will be designed in accordance with Building Regulations Part H and will become the responsibility of the building operator.

6.2 The proposed attenuation will be retained under private ownership and will be operated and maintained by the building operator in accordance with CIRIA C753 Chapter 32, together with any manufacturer specific guidance.

6.3 At the detailed design stage, a 'Drainage Maintenance Plan' can be prepared to set out maintenance tasks, responsibilities, and frequencies for the entire drainage network.

7 Conclusion

7.1 The proposed development has been assessed in line with the National Planning Policy Framework, to allow the planning application to be progressed and to show that the development can be undertaken in an acceptable manner from a flood risk perspective.

7.2 The proposed site is located within Flood Zone 1 and are not known to be susceptible to flooding from pluvial, groundwater, infrastructure, or artificial sources.

7.3 To ensure the development is safe from flooding throughout its lifetime, the surface water strategy accounts for runoff in up to the 1 in 100-year return period.

7.4 The strategy also safeguards against climate change (45%), providing betterment over existing conditions, where the rate and volume of runoff would continue to increase due to climate change.

7.5 Infiltration is considered a suitable method of surface water disposal. The use of soakaways are therefore prioritised in line with the drainage hierarchy.

7.6 The proposed surface water management plan will reduce the peak rates and volumes of runoff compared to baseline conditions and will also offer a significantly reduced pollution hazard compared to the sites previous use as a cattle market.

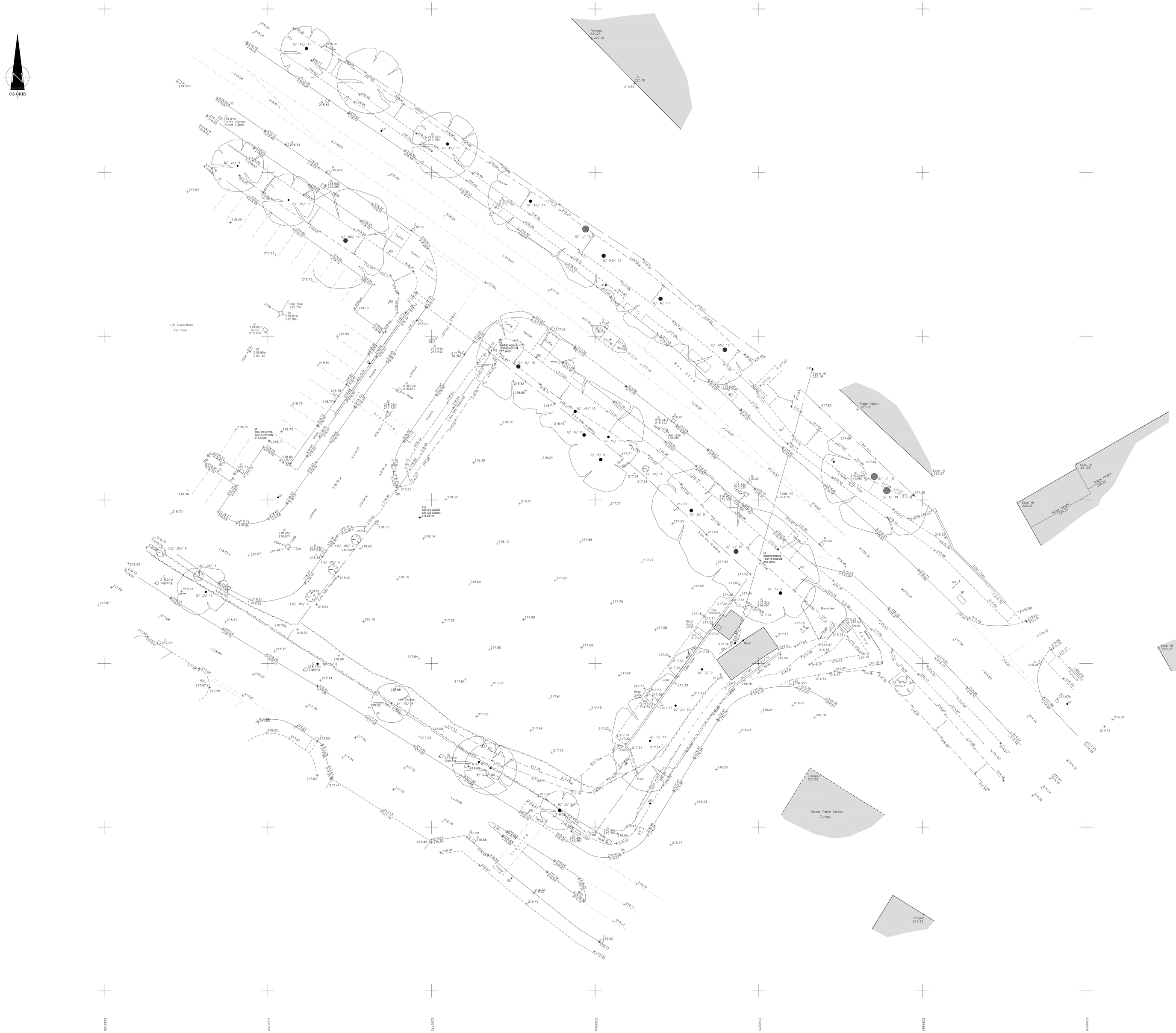
7.7 Beyond the 100-year critical storm, exceedance runoff will be directed away from the proposed building and towards any residual areas of open space and/or car parking, where any aboveground storage can be used.

7.8 The existing on-site private foul sewer will be diverted to accommodate the development. Foul flows generated by the proposed development will be served by a new private gravity network and will tie into the diverted foul sewer, which continues downstream to Wessex Water's adopted foul network within Christy's Lane.

7.9 All on-site proposed drainage will remain private and will be designed in accordance with Building Regulations Part H and CIRIA C753 and will become the responsibility of the building operator.

7.10 As the development will be safe from flooding throughout its lifetime and will actively reduce the flood risk to properties within the downstream catchment, it is recommended that the Local Planning Authority confirm they have no objections to the proposed development.

Appendix A Topographic Survey



LEGEND

AV	Air Valve	RS	Road Sign
BL	Bollard	SC	Stop Cock
BM	Bench Mark	Str	Strainer
BP	Boundary Point	SV	Stop Valve
BT	British Telecom Cover	TL	Threshold Level
C.ATV	Cable Television Cover	TP	Telephone Pole
CL	Cover Level	WM	Water Meter
EP	Electric Power Pole	WO	Wash Out
EV	Eave Level	UTL	Unable To Lift
FH	Fire Hydrant	Fence Descriptions	
FL	Floor Level	B/W	Barbed Wire
FP	Fence Post	C/B	Close Boand
G	Gully	C/I	Corrugated Iron
GP	Gate Post	C/L	Chain Link
GV	Gas Valve	C/P	Chestnut Paling
IC	Inspection Chamber	C/W	Chicken Wire
IL	Invert Level	I/R	Iron Railings
KO	Kerb Outlet	P/R	Post & Rail
LC	Basement Light	P/W	Post & Wire
LP	Lamp Post		Rock Face
M	Meter		Glass Roofed
MH	Manhole Cover		Buildings & Walls
MK	Marker		Double Gates
MS	Milestone		Single Gate
RG	Ridge Level		

LINETYPE MENU

Top of Bank
Toe of Bank
Building
Kerb
Foliage
Hedge
Pipe
Verge
Wall
Track
Fence
Telephone
Electric
Road Markings
Tree Spread/Trunk Dia/Height
Manhole
SWS (Estimated Size \ From Surface) — 150ø
FWS (Estimated Size \ From Surface) — 225ø

D&H Surveys Ltd
The Manor Stables, Great Somerford, Chippenham Wiltshire, SN15 5EH.
Email: admin@dhsurveys.co.uk
Website: www.dhsurveys.co.uk
Tel (01249) 720545
Fax (01249) 721124

Topographic Surveys	As Built Drainage Surveys
Elevation Surveys	Co-ordination Of Site Layouts
Floor Plan Surveys	Rectified Photo Elevations
Volumetric Surveys	C.A.D Plotting Bureau

Project Name:
Christy's Lane
Shaftsbury SP7 8TL

Drawing Title:
Topographic Survey

Client:
Churchill Retirement Living

Agent:

Date:	Scale:
April 2023	A0 @ 1:200

Drawn	Surveyor	Dwg No	Revision
KJH	SCB	SU 01	

Site Datum	OSBM Ref
Ordnance Survey	OS15
Grid Orientation	**Sheet ID**
Ordnance Survey	CHURCHILL-Shaftsbury-Christys

Disclaimer
D & H Surveys will Guarantee that this Survey Data & Station Coords are Correct to the Indicated Scale ONLY

Appendix B Arboricultural Constraints Plan

Tree constraints plan
Location of trees, categorisation and development constraints

Christy's Lane, Shaftesbury, Dorset SP7 8TL

Barrell Plan Ref: 23061-1 A

barrell TREE CONSULTANCY

www.barrelltreecare.co.uk

TX BS category B Trees of moderate quality

TX BS category C Trees of low quality

TX BS category U Trees unsuitable for retention

Estimated tree positions not included on original land survey and adjusted crown spreads

This constraints plan provides sufficient information to interpret the tree constraints when designing a new layout. This guidance must be carefully reviewed with the individual tree information provided in the schedule on this plan. If there is any doubt about how to interpret this information, you must check it out with Barrell Tree Consultancy (BTC) on 01425 651470 or info@barrelltreecare.co.uk.

The number of each tree, hedge and group is highlighted in colour to enable quick identification of tree categories. Category A and B trees are green; category C and U trees are blue. The number of each A and B tree is set inside a green triangle; the number of each C and U tree is set inside a blue rectangle. Category A trees are shown with double triangles and U trees are shown with double rectangles. Zone 1, indicating the RPA where no ground disturbance should occur, is annotated with dark shading. Zone 2, indicating where shading, dominance and/or future growth may be an issue, is annotated with light shading.

How to use the constraints information

Our interpretation of the starting-point recommendations of BS 5837(2012) is that only category A and B trees are sufficiently important to influence a layout, so the category C and U trees are discounted in this constraints advice. The constraints that the A and B trees are likely to impose have been assessed as follows:

Zone 1 (dense coloured shading): This is called the root protection area (RPA) where ground disturbance must be carefully controlled. If encroachment is planned within the RPA, then this must be assessed on a tree-by-tree basis by BTC. If important trees are to be successfully retained, no significant disturbance should occur within the RPA and a high level of care is needed when working within it.

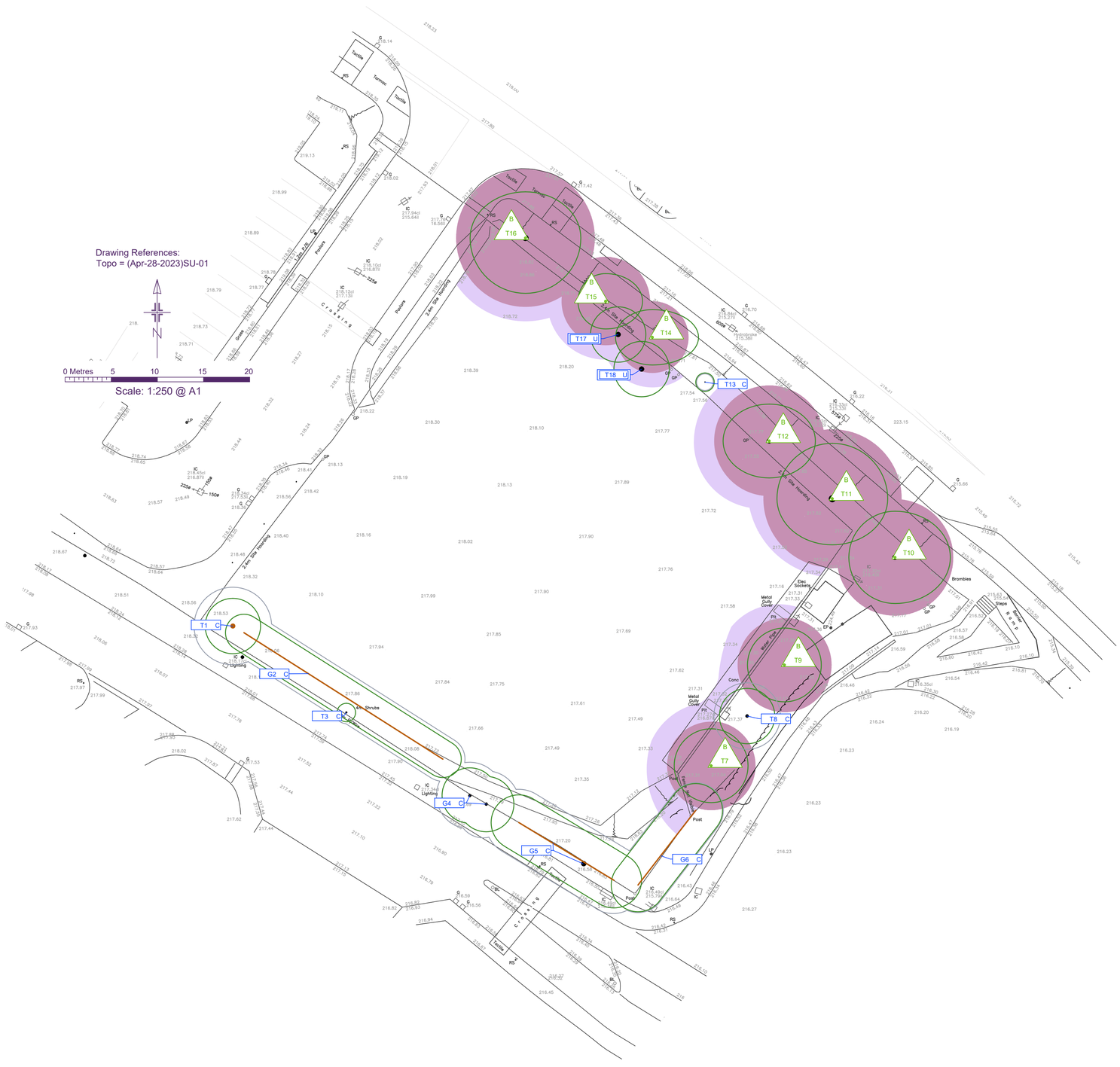
Zone 2 (light coloured shading): The second constraint is where shading/dominance/future growth may be an issue and is our estimate of how much space may be needed to retain trees after the development activity when the pressures of residential occupation come to bear. Factors such as crown density, future growth potential, orientation in relation to the sun and the number of trees in groups are considered to arrive at this second, less restrictive, constraints zone. Zone 2 is not normally suitable for occupied buildings, but uninhabited structures and hard surfacing may be acceptable within it.

Zone 3 Nominal RPA radii for category C trees:
Low quality only to be considered for retention if there is scope within the layout and they do not compromise the potential to establish new trees of higher future sustainability.

Designers should try to avoid the loss of category A and B trees because the LPA will consider them important in determining the full impact of the proposal. Category C trees can be considered for retention if there is scope within the scheme. However, their loss should not be a material constraint and layouts do not have to be designed around keeping them. As a starting point in the design process, no significant disturbance should occur within the RPA of any category A and B trees shown as zone 1. There is sometimes scope to reduce this slightly in some directions if a corresponding increase can be achieved in other directions that results in the RPA remaining the same. However, such changes should be the exception rather than the rule and must be assessed on a tree-by-tree basis by BTC.
Under some circumstances, it may be acceptable to place footpaths, roads, services (including drains and soakaways) and unoccupied buildings within zone 1, but special precautions will be required and should be detailed after consultation with BTC. However, designers should always remember that the more encroachment there is into the RPA, the more likely the LPA are to object to the layout. Further consideration is required for occupied buildings; areas within the existing or future crown spread of retained trees or in areas of excessive shade should be avoided. This is the zone 2 illustrated on the plan. Exceptionally, non-inhabited buildings such as garages may be acceptable within zone 2, but this would not normally apply to residential occupied buildings. Pruning overhanging branches may also be an option, but often prompts objections from LPAs. If such pruning is proposed, BTC must advise on the implications.

Limitations and warnings

- This plan is confidential to the client and should not be released to any third parties without authorisation
- It does not consider any ecological or other constraints that may exist on the site
- Assessing constraints is subjective, especially the zone 2 advice, and the LPA may not agree with the BTC interpretation
- The plan is based on provided information and should only be used for dealing with the tree issues
- All scaled measurements must be checked against the original documents
- This constraints guidance is preliminary and only suitable for drawing up initial design proposals
- Further consultation with BTC is essential before finalising any layout



Tree No	Species	Height	Category	RPA Radius (m)
T1	Beech	8	C	4.2
G2	Hawthorn	4	C	2.4
T3	Birch	9	C	1.2
G4	Elder	4	C	3.6
G5	Beech, maple	6	C	3.6
G6	Maple	7	C	3
T7	Alder	12	B	4.8
T8	Norway maple	10	C	3.6
T9	Alder	9	B	5.1
T10	Beech	15	B	6.3
T11	Beech	16	B	7.5
T12	Beech	14	B	6
T13	Beech	3	C	0.9
T14	Beech	13	B	3.9
T15	Beech	17	B	4.8
T16	Beech	16	B	7.5
T17	Ash	12	U	6
T18	Ash	10	U	6

Appendix C Ground Investigation Reports

Hydrogeological information indicates that the bedrock strata is classified as 'Principal Aquifer'. There is no listed aquifer within superficial deposits. Approximately 100 m north of the site is a licenced groundwater abstraction (Wincombe Lane) for industrial/general use. About 350 m west of the site, is a licensed groundwater abstraction (Barton Hill Wells) that provides a potable water supply operated by Wessex Water. There are no other active water abstractions listed within 1 km. The site lies within a Zone 3 Source Protection Zone (Total Catchment). The site also lies within an extensive Drinking Water Safeguard Zone (Surface Water), but is not within a designated Protected Area, nor within a Drinking Water Safeguard Zone (Groundwater).

The Groundsure report (based on UK Health Security Agency and British Geological Survey data, updated December 2022) indicates that the site is within an area where Basic radon precautions should be provided in new buildings.

5. GROUND CONDITIONS AND GEOLOGICAL MODEL

5.1 Ground Investigation

Details of the rationale and scope of the ground investigation and laboratory testing, together with exploratory hole logs, monitoring, in situ and laboratory test results, are given in Appendix I. The investigation has identified the presence of the following, below the site.

5.2 Buried Foundations and Services

No buried foundations or other such structures were encountered during the ground investigation. It is understood that a foul drain crosses, east to west, within the northern part of the site. Although no major former buildings are recorded within the site, it remains possible that buried remains of other structures (such as weigh-bridges or other features) could be present below surface.

5.3 Strata Encountered

Made Ground
Made Ground was encountered across the site, to typical depths of between 0.6 m to approximately 1.4 m. The materials generally comprise gravels over silty clays with man-made inclusions, such as brick.

Weathered Boyne Hollow Chert Member
Boyne Hollow Chert Member strata encountered at the site generally comprise medium dense clayey gravels and sands with high cobble content and layers of firm to stiff consistency (estimated high strength) sandy clays. An upper layer of clayey gravels, overlie sands with sandstone lithorelics. Extremely weak sandstone strata were encountered within one pit at 2.3 m depth. These strata were proven to a maximum depth of 5 m, below this strength/density of the strata precluded further boring/sampling.

5.4 Groundwater

Groundwater was not encountered within any of the exploratory holes. With reference to the data ion the Desk Study Appraisal Report, groundwater is indicated at depths in excess of 5 m; well record data indicates groundwater may be located in excess of 30 m depth.

The groundwater conditions are based on observations made at the time of the fieldwork. It should be noted that groundwater levels may vary due to seasonal and other effects.

6. PROPOSED DEVELOPMENT

The proposed development includes the following buildings and other structures, as shown on Figure 3:

- Up to three-storey retirement apartment building
- Car parking
- Areas of managed soft landscaping
- Associated infrastructure

7. ASSESSMENT OF POTENTIAL CONTAMINATION AND GROUND GASES

7.1 Assessment Criteria

Assessment of potential contamination and ground gases has been undertaken using a risk assessment-based approach, as recommended within the Environmental Protection Act (1990) (and subsequent amendments), Environment Agency LCRM (2020), CLEA Model (2004-2009), BS 10175:2011+A2:2017, CIRIA C552 (2001) and NHBC R&D Report 66 (2008). This approach considers the likely source of contamination, given the history and location of the site, and the possible migration pathways by which these potentially hazardous substances may reach likely receptors, such as end users of the site, controlled waters or the wider environment, in the context of the proposed development.

Part IIA of the Environmental Protection Act (1990) states that

'Contaminated Land is any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that –

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or
(b) significant pollution of controlled waters is being caused or there is significant possibility of such pollution being caused;'

All risk assessments carried out as part of this investigation have been carried out with respect to the definition of 'contaminated land' within Part IIA of the Environmental Protection Act (1990) and have considered the site both before and on completion of the development. The basis of the risk assessment is the Conceptual Site Model, which is derived from the desk study and initial information and identifies potential contaminant linkages that could affect receptors relevant to the site and the wider environment. The Conceptual Site Model is presented in Table 1.

Based on the model, a ground investigation was designed to obtain relevant information to assess further the identified contaminant linkages. Where relevant, this included the recovery of representative samples and subsequent analytical laboratory testing. The rationale for the sampling and testing is set out in Appendix I. The results of the analytical testing are presented in Appendix I and summarised in Tables 2 and 3. On the basis of the conceptual site model and the results of the analytical laboratory testing, an assessment of the identified contaminant linkages is presented in Table 4.

7.2 Potential Sources of Contamination

Historical maps indicate that the site has been associated with the former cattle market since the 1960s and previously had structures present. Given the age of the market development, it is possible that ash and clinker rich materials have been used as a sub-base layer in the past. These materials can contain high metal and polyaromatic hydrocarbon concentrations. It is likely that the cattle market would have disinfecting procedures in place. Modern disinfectants are unlikely to be of environmental concern. However, historical disinfectants may have contained such chemicals as phenols (and other semi-volatile organic compounds (SVOCS)) or been acid-based. It is possible that the disinfectant-related compounds, as indicated above, could have entered the shallow soils, although in view of the small volumes of such substances used, the period since such materials might have been used and hard-surfacing across the site, significant soil impaction would not be expected and a valid migration pathway to the (relatively deep) groundwater is not currently indicated.

Former structures on site may have been associated with asbestos containing construction materials. During demolition of the former structures, it is possible that such asbestos containing materials (ACMs) could have entered the ground. However, as it is understood that demolition was completed relatively recently, it can be presumed that safe statutory working procedures were followed, such that risks of ACMs remaining within the ground should be very low.

On the adjacent land to the east of the site there is a fuel station. Such a site is associated with storing large amounts of petroleum hydrocarbons. Whilst there is potential for such hydrocarbons to leak and leach into the surrounding ground, the facility is of modern design and controlled by Environmental Permits, hence the risk of a significant pollution incident occurring that would result in detriment to the development is considered to be very low. Notwithstanding this, it should be appreciated that planning policies may require a designated separation between a residential development and the location of fuel storage tanks, in compliance with fire safety regulations.

Based on the available information, representative soil samples were recovered from the Made Ground materials encountered beneath the site and tested for the potential contaminants identified above. The test results are summarised in Table 2 and are presented against generic assessment criteria (GAC) and Category 4 Screening Levels (C4SL), relevant to the protection of human health in a residential development with managed landscaping. As can be seen from Table 2, all potential contaminant concentrations are recorded below the GAC (negligible risk to human health) and C4SL (low but acceptable risk to human health) and therefore, do not represent an unacceptable risk to end users. Additional comments relevant to human health risk assessment are provided in Section 7.3.1.

Based on appropriate laboratory test data, risks to construction materials are assessed in Section 7.3.2.

No significant concentrations of potentially phytotoxic chemicals have been recorded. However, as the site is currently devoid of topsoil, a suitable thickness of topsoil is likely to be required to provide a growing medium in proposed soft landscaping areas. Further comment is provided in Section 7.3.3.

In addition to soil testing, leachates, generated from soil samples recovered from the site, have been analysed for metal compounds and are compared, in Table 3, against relevant environmental standards (in view of the nearby water supply, drinking water standards are referenced). The testing has not identified significant exceedances above the standards within the small volumes of Made Ground recorded on site. It is also noted that a significant unsaturated zone (likely to be in excess of 30 m) is indicated below the site which would significantly promote dispersion/adsorption. No significant concentrations of mobile potential contaminants have been identified. On this basis, it is considered that there is no valid contaminant source present at the site in relation to controlled waters and no further risk assessment is required.

There is no evidence to suggest that putrescible material or significant thicknesses of organic Made Ground should be expected beneath the site and there are no active or historical landfills within influencing distance of the site. However, the site is located within an area where Basic precautions against the ingress of radon gas are required in new buildings.

7.3 Contaminant Linkages – Solids and Liquids

Based on the Conceptual Site Model, consideration is given below to identified contaminant linkages and a risk evaluation is undertaken of each possible source-pathway-receptor linkage that may occur at the site. The risk evaluation considers the potential consequences and probability of occurrence in accordance with CIRIA C552 (2001). Where risks are identified as 'negligible', then by implication such risks are within normally accepted levels for the proposed development, and the further reduction of such risks by remediation works is considered unnecessary. Where risks are identified that are 'low' as defined in CIRIA C552 (2001), or worse, then consideration is given to the management of the identified risks, with appropriate recommended actions that may include engineering solutions/remediation works as described in the following sections.

7.3.1 Human Health

Potential contaminants associated with the site history have been identified at concentrations below relevant GAC and C4SL values and asbestos fibres have not been recorded. Therefore, no valid contaminant linkages for the proposed development have been identified.

Groundworkers involved in the constructions of the new development are unlikely to be exposed to short term (acute risks). However, in line with good practice, it is recommended that appropriate personal protective equipment (PPE) be worn and high levels of personal hygiene be maintained by groundworkers. To minimise soils at the site becoming airborne and moving beyond the site boundaries during earth moving operations, it is recommended that appropriate soil dampening equipment be maintained on site during dry periods to minimise dust generation.

7.3.2 Durability of Buried Structures and Services

In view of the low soluble sulphate content and near-neutral soil conditions, there are no special precautions required for the protection of good quality buried foundation concrete. Based on guidance within *BRE Special Digest 1* (2005), the specified DC Class of concrete for buried structures and foundations should be suitable for an ACEC site classification of AC-1.

The site maybe considered to be 'brownfield' under the definition provided by UKWIR (2010) with respect to the assessment of ground for water supply pipes. Based on the guidance provided by UKWIR, there would be a requirement to test appropriate soil samples from the line of proposed potable water supply pipes and to compare the test results with published criteria before consideration could be given to using conventional plastic materials for potable supply pipes. It would be prudent, therefore, to make allowance for the use of multi-layer barrier pipes. If the Client wishes to use conventional plastic materials, testing can be undertaken once the potable supply layout has been finalised. Alternatively, the decision can be made to provide the barrier pipe materials without undertaking additional testing.

It should be noted that individual water companies may have in-house requirements for the assessment of ground conditions for potable water supply pipes and these requirements may be in addition to, or may contradict, the guidance provided by UKWIR. Therefore, it is recommended that the relevant water supply company be consulted prior to finalising the potable water supply design.

7.3.3Landscape Areas

It is noted that the site is largely devoid of topsoil for a suitable growing medium. Therefore, there will be a requirement to import topsoil to provide a growing medium for plants. The topsoil quality requirements for the imported materials should consider both the proposed planting and any imported soils should be verified with documentation/laboratory test reports as suitable for use within a residential development (and compliant with published NHBC requirements).

7.4 Contaminant Linkages – Gases

Based on the Conceptual Site Model, consideration is given below to identified contaminant linkages and a risk evaluation is undertaken of each possible source-pathway-receptor linkage that may occur at the site. Where risks are identified as 'negligible', then by implication such risks are within normally accepted levels for the proposed development, and the further reduction of such risks by remediation works is considered unnecessary. Where risks are identified that are 'low' as defined in CIRIA C552 (2001), or worse, then consideration is given to the management of the identified risks, with appropriate recommended actions that may include engineering solutions with remediation works or ground gas protection and control systems as described below. Reference is made to guidance published in BRE BR211 (2015), as referenced by the Building Regulations, to relevant assessment criteria published in BS 8485:2015+A1:2019and to best-practice guidance as published in BS 8576:2013, CIRIA C665 (2007) and NHBC/RSK (2007), as listed in the References.

There is no evidence to suggest that putrescible material or significant thicknesses of organic Made Ground should be expected beneath the site and there are no active or historical landfills within influencing distance of the site. On this basis, it is evident that there are no valid contaminant linkages regarding landfill type gases.

Notwithstanding the above, the site lies within an area where 'Basic' radon precautions should be provided within new buildings in compliance with the guidance published in BRE BR211 (2015), and NHBC Technical Guidance 4.1/01 (2023).

7.5 Recommended Remedial Works

On the basis of the available information, the following remedial works are recommended:

- Installation of 'Basic' radon precautions within the proposed building(s) is required in compliance with the guidance published in BRE BR211 (2015), Approved Document C (2013). '*Site preparation and resistance to contaminants and moisture'* (2004 Edition incorporating 2004, 2010 and 2013 amendments) and NHBC (2023) Technical Guidance 4.1/01.
- With reference to the above, sufficient protection should be provided by a well-installed 1200-gauge (300 µm) polyethylene membrane modified and extended to form a radon barrier across the footprint of the building (including across wall cavities, and sealed against services penetrations).
- The installation of the radon precautions should be inspected and recorded, in compliance with the requirements of NHBC/Building Control organisation (and, if applicable, local planning authority).

7.6 Construction Management/Best Practice

In compliance with normal good practise in the redevelopment of brownfield land, consideration should be given to the following:

water may locally be encountered. If perched water does enter excavations, screened sump pumping may be required.

11. ASSESSMENT OF SOAKAWAY DRAINAGE

Soakaway data is summarised in Table I-4. On the basis of the ground investigation data, the ground conditions may be considered to be compatible with a soakaway drainage solution, as outlined in the guidance published in CIRIA C753 (2015). Consideration may be given to an infiltration value of 2×10^{-5} m/s for soakaway assessment/design.

As outlined in Section 3, the site is underlain by Principal Aquifer strata and lies within a Zone 3 Source Protection Zone. However, with reference to the risk assessment in Section 7, no valid contaminant linkage is indicated in relation to Controlled Waters and no development constraints were identified in this context. On this basis, groundwater protection issues should not preclude the use of soakaway drainage systems, although reference should be made to any requirements of the Environment Agency in this regard.

With reference to the guidance published in Environment Agency (2018), which includes Position Statement G12, the discharge of clean roof-water to ground is considered acceptable by the Agency. Reference may be made to the Agency Position Statements G10 and G13 regarding the discharge of surface runoff water from hard-standing areas, and such soakaway systems should comply with the following:

- Be of suitable design.
- Comply with published design standards for SuDS drainage systems.
- Provide a 'robust' surface water management system that does not pose an unacceptable risk of pollution to groundwater.

It should be appreciated that soakaways should be located in areas that maintain the necessary foundation support to existing and proposed structures. Preliminary drainage designs may consider a minimum distance of 5 m between soakaways/infiltration and the foundations of existing and proposed structures.

In order to minimise risks of potential inundation settlement/subsidence, soakaways should not discharge into Made Ground materials.

12. ROAD PAVEMENTS

Based on the nature of the shallow soils beneath the site a preliminary design equilibrium CBR of 3% may be considered for the design of road pavements. The materials at shallow depth should be regarded as frost susceptible.

13. ASSESSMENT OF MATERIALS FOR WASTE DISPOSAL

There is no requirement to remove soils from site and, therefore, development levels should be set such that soils can be retained and reused on site where possible. Providing development levels are set to accommodate soil arisings (for example, from foundation excavations), such materials would not be classified as waste if retained and re-used on site. However, if materials are excess to requirements, they should be taken to an appropriately permitted waste facility.

TABLES

CONCEPTUAL SITE MODEL

	Potential Contaminant Source	Potential Contaminants	Potential Pathway	Receptors and Assessed Contaminant Linkage
On-Site Solid	Former cattle market Demolition of historical buildings	Toxic metals Phytotoxic metals Polyaromatic hydrocarbons Semi-Volatile organic compounds (SVOC – phenols) Asbestos fibres/ACM	Dermal and oral exposure pathways (including air-borne migration) are present during construction phase but will generally not be present following development due to building and hardstanding effective barriers. Limited landscaping areas after development represent possible dust exposure pathways. Certain organic compounds can readily penetrate plastic construction materials. ***Release into Liquid Phase*** Metals and PAHs have generally low solubility. SVOCs may have variable solubility/mobility depending on specific substance. Potential for plant uptake of metals. ***Release into Vapour Phase*** No valid source indicated.	**Human Health** *End Users:* Possible contaminant linkage *Groundworkers:* Possible contaminant linkage *Neighbouring Properties:* Possible contaminant linkage ***Buried Structures & Services*** *Buried concrete:* No contaminant linkage *Potable water pipes:* Possible contaminant linkage *Other buried structures:* No contaminant linkage **Landscape Areas** Possible contaminant linkage
Off-Site Solid	No evidence of potential source	n/a		
On-Site Liquid	Former Cattle market (no evidence of large-scale liquid storage, leaks from small containers likely to be fully adsorbed to soils)	Semi-Volatile organic compounds (SVOC – phenols)	No shallow groundwater is indicated. Hence, a valid migration pathway to groundwater is not currently indicated. ***Release into Vapour Phase*** No valid source indicated.	
Off-Site Liquid	Petrol station to east (potential for free-phase/dissolved phase source crossing site boundary). However, risks mitigated by storage/operational requirements and associated permits	Petroleum hydrocarbons Volatile organic compounds		
On Site Liquid	Former Cattle market (no evidence of large-scale liquid storage, leaks from small containers likely to be fully adsorbed to soils) Leaching from solid source	Semi-Volatile organic compounds (SVOC – phenols) Metals (limited potential source) Petroleum hydrocarbons (source dependent on mobile fraction presence) Polyaromatic hydrocarbons (limited potential source) Semi-volatile organic compounds (SVOC – phenols)	A significant unsaturated zone is indicated, such that groundwater appears to be well below Made Ground and potentially impacted soils, such that a valid migration pathway to groundwater is not currently indicated.	**Controlled Waters** *Groundwater:* Principal aquifer, Zone 3 Source Protection Zone – No contaminant linkage *Surface Water*: No nearby watercourses – No contaminant linkage
Ground Gases	Radon affected area Landfill type gases – no viable source indicated	Radon	Limited potential for gas migration to the site. Ground gases may enter the proposed building through cracks in floor slabs or cavity walls due to pressure differential	**Human Health** *End Users:* Possible contaminant linkage (Radon)

NOTES

1. The above conceptual model is based on CIRIA C552 (2001) and BS 10175:2011+A2:2017, BS EN ISO 21365:2020 and Environment Agency Land Contamination Risk Management (LCRM) (2022).
2. The Conceptual Site Model is prepared from available desk study information. Where a site walkover or ground investigation identifies information that was not known at the desk study stage, such information is used to modify the Model.
3. Where a contaminant linkage is identified, any subsequent ground investigation is designed to obtain relevant information to assess the contaminant linkage. See Table 3 for a summary of contaminant linkage assessments.

SUMMARY OF ANALYTICAL TEST DATA: SOILS
RISKS TO HUMAN HEALTH

Determinand	Units	No of Tests	Concentration (mg/kg)		Generic Assessment Criteria (mg/kg) Residential Without Plant Uptake		Category 4 Screening Level (mg/kg) Residential Without Plant Uptake	
			Min	Max	Value	No>GAC	Value	No>C4SL
Arsenic	mg/kg	6	3.8	8.2	40[1]	0	40[3]	0
Cadmium	mg/kg	6	<0.2	0.4	85[1]	0	149[3]	0
Chromium (Total) [4]	mg/kg	6	24	52	910[1]	0	-	-
Chromium (VI)	mg/kg	6	<1.8	<1.8	6[1]	0	21[3]	0
Lead	mg/kg	6	22	140	-	-	310[3]	0
Inorganic Mercury	mg/kg	6	<0.3	<0.3	56[1]	0	-	-
Nickel	mg/kg	6	11	33	180[1]	0	-	-
Selenium	mg/kg	6	<1.0	<1.0	430[1]	0	-	-
Copper	mg/kg	6	6.9	21	7100[1]	0	-	-
Zinc	mg/kg	6	29	110	40,000[1]	0	-	-
Boron	mg/kg	6	0.3	0.7	11,000[1]	0		
Phenols	mg/kg	6	<1.0	<1.0	440[1]	0	-	-
pH	-	10	6.4	7.7	-	-	-	-
Total Organic Carbon	%	6	0.2	1.8	-	-	-	-
Petroleum Hydrocarbons								
TPH: $C_6 – C_{35}$	mg/kg	6	<20	<20	-	-	-	-
Aliphatics $C_5 – C_6$	mg/kg	4	<0.001	<0.001	78[1]	0	-	-
Aliphatics $C_6 – C_8$	mg/kg	4	<0.001	<0.001	230[1]	0	-	-
Aliphatics $C_8 – C_{10}$	mg/kg	4	<0.001	<0.001	65[1]	0	-	-
Aliphatics $C_{10} – C_{12}$	mg/kg	4	<1.0	<1.0	330[1]	0	-	-
Aliphatics $C_{12} – C_{16}$	mg/kg	4	<2.0	<2.0	2400[1]	0	-	-
Aliphatics $C_{16} – C_{35}$	mg/kg	4	<16	<16	92,000[1]	0	-	-
Aromatics $C_6 – C_7$	mg/kg	4	<0.001	<0.001	690[1]	0	-	-
Aromatics $C_7 – C_8$	mg/kg	4	<0.001	<0.001	1800[1]	0	-	-
Aromatics $C_8 – C_{10}$	mg/kg	4	<0.001	<0.001	110[1]	0	-	-
Aromatics $C_{10} – C_{12}$	mg/kg	4	<1.0	<1.0	590[1]	0	-	-
Aromatics $C_{12} – C_{16}$	mg/kg	4	<2.0	<2.0	2300[1]	0	-	-
Aromatics $C_{16} – C_{21}$	mg/kg	4	<10	<10	1900[1]	0	-	-
Aromatics $C_{21} – C_{35}$	mg/kg	4	<10	<10	1900[1]	0	-	-
VOCs								
Benzene	mg/kg	6	<0.005	<0.005	0.70[1]	0	1.6[3]	0
Toluene	mg/kg	6	<0.005	<0.005	1900[1]	0	-	-
Ethylbenzene	mg/kg	6	<0.005	<0.005	190[1]	0	-	-
Xylene	mg/kg	6	<0.005	<0.005	180[1]	0	-	-
MTBE	mg/kg	6	<0.005	<0.005	120[2]	0	-	-
Asbestos	%	6	Not Detected	Not Detected	-	-	-	-

Determinand	Units	No of Tests	Concentration (mg/kg)		Generic Assessment Criteria (mg/kg) Residential Without Plant Uptake		Category 4 Screening Level (mg/kg) Residential Without Plant Uptake	
			Min	Max	Value	No>GAC	Value	No>C4SL
PAHs								
Naphthalene	mg/kg	6	<0.05	<0.05	5.6[1]	0	-	-
Acenaphthylene	mg/kg	6	<0.05	<0.05	4600[1]	0	-	-
Acenaphthene	mg/kg	6	<0.05	<0.05	4700[1]	0	-	-
Fluorene	mg/kg	6	<0.05	<0.05	1600[1]	0	-	-
Phenanthrene	mg/kg	6	<0.05	<0.05	1500[1]	0	-	-
Anthracene	mg/kg	6	<0.05	<0.05	35,000[1]	0	-	-
Fluoranthene	mg/kg	6	<0.05	0.13	1600[1]	0	-	-
Pyrene	mg/kg	6	<0.05	0.12	3800[1]	0	-	-
Benz(a)anthracene	mg/kg	6	<0.05	0.07	14[1]	0	-	-
Chrysene	mg/kg	6	<0.05	0.09	31[1]	0	-	-
Benzo(b)fluoranthene	mg/kg	6	<0.05	0.10	4.0[1]	0	-	-
Benzo(k)fluoranthene	mg/kg	6	<0.05	0.05	110[1]	0	-	-
Benzo(a)pyrene	mg/kg	6	<0.05	0.08	3.2[1]	0	5.3[3]	0
Indeno(123cd)pyrene	mg/kg	6	<0.05	<0.05	46[1]	0	-	-
Dibenzo(ah)anthracene	mg/kg	6	<0.05	<0.05	0.32[1]	0	-	-
Benzo(ghi)perylene	mg/kg	6	<0.05	<0.05	360[1]	0	-	-
Other SVOCs	mg/kg	6	<0.3	<0.3	-	-	-	-

NOTES

1. Suitable for Use Level (S4UL) published by LQM/CIEH, 2015 – Residential Without Plant Uptakelanduse. S4UL assumptions comprise 2.5% soil organic matter, soil pH of 7 and sandy loam soil type.S4ULs are copyright © Land Quality Management Limited reproduced with permission; Publication Number S4UL3133.
2. Soil GAC for Human Health Risk Assessment produced by CL:AIRE (2010) – Residential Without Plant Uptake. Assumption of 2.5% soil organic matter.
3. Category 4 Screening Level (C4SL), Department for Environment Food and Rural Affairs (March 2014) – calculated for 2.5% SOM using the CLEA Model v1.071
4. In the absence of desk study or historical map evidence indicating a potential source of chromium (VI) usage at or in the near vicinity of the site (and confirmed by laboratory testing), total chromium concentrations have been compared to the GAC for chromium (III).

TABLE 3

SUMMARY OF ANALYTICAL TEST DATA: WATER LEACHABLE SUBSTANCES

Determinand	No of Tests	Concentration (µg/l)		Published Environmental Quality Standard (as listed in the Notes)	
		Min	Max	Value (µg/l)	No > Value[4]
Arsenic	6	<1.0	7	10 [1]	0
Cadmium	6	<0.08	<0.08	3.0 [1]	0
Chromium	6	<0.4	3.5	50 [1]	0
Lead	6	<1.0	15	10 [1]	1 [2]
Mercury	6	<0.5	<0.5	1.0 [1]	0
Copper	6	7.3	72	2,000 [1]	0
Zinc	6	4.3	56	125[1]	0
Selenium	6	<4.0	<4.0	10[2]	0

NOTES

1. WHO (2022) Guidelines for drinking-water quality.
2. Value marginally exceeds WHO value at one location only and as associated with a small volume of potential source soil material.

ASSESSMENT OF CONTAMINANT LINKAGES

NOTES:
1. Contaminant linkage validity assessed following qualitative or semi-quantitative risk assessment.
2. Contaminant linkage assessed following detailed quantitative risk assessment or assuming the recommended remediation or mitigation measures are in place.

		Consequence (C)			
		Severe	Medium	Mild	Minor
Probability (P)	High likelihood (HL)	Very High Risk	High Risk	Moderate Risk	Moderate/ Low Risk
	Likely (L)	High Risk	Moderate Risk	Moderate/ Low Risk	Low Risk
	Low likelihood (LL)	Moderate Risk	Moderate/ Low Risk	Low Risk	Very Low Risk
	Unlikely (UL)	Moderate/ Low Risk	Low Risk	Very Low Risk	Very Low Risk

All terminology in accordance with the definitions provided in CIRIA C552 (2001)

Contaminant Linkage			Assessment of Contaminant Linkage following Ground Investigation	Contaminant Linkage Valid? [1]	Risk Rating			Quantitative Risk Assessment	Recommended Remediation/Mitigation (See Section 7 for further details)	Recommended Work Verified?	Contaminant Linkage Valid? [2]
Source	Pathway	Receptor			C	P	Risk				
Toxic metals PAHs Petroleum Hydrocarbons SVOCs	Ingestion (dust), Dermal (dust) Inhalation (dust), Inhalation (vapour)	End Users	All concentrations below GAC/C4SL values	No	N/A	N/A	N/A	Not applicable	Not required	Not applicable	No
Asbestos			No asbestos identified	No	N/A	N/A	N/A				
Toxic metals PAHs Petroleum Hydrocarbons SVOCs	Dermal contact, Ingestion, Inhalation	Construction workers	All potential contaminants identified in concentrations below short-term (acute) exposure limits	No	N/A	N/A	N/A	Not applicable	Not applicable but standard personal protective equipment is recommended as good practice. Conventional dust control and soil dampening to be used during construction.	To be confirmed during construction stage	No
Asbestos			No asbestos identified	No	N/A	N/A	N/A				
Toxic metals PAHs Petroleum Hydrocarbons SVOCs	Dermal contact (dust), Ingestion (dust), Inhalation (dust)	Neighbours/general public	All concentrations below GAC/C4SL values	No	N/A	N/A	N/A	Not applicable	Not required but dust suppression techniques should be used during construction in line with good practice.	To be confirmed during construction stage	No
Asbestos			No asbestos identified	No	N/A	N/A	N/A				
Organic compounds	Chemical permeation/direct contact	Potable water pipes	No significant organic compounds detected.	Yes	Med	UL	Very Low	Not applicable	At this stage, allowance to be made for multi-layer barrier pipe or other protective pipe material to be used for potable water supply.	To be confirmed during construction phase	No
Phytotoxic metals	Plant uptake	Landscape areas	No significant concentrations identified	No	N/A	N/A	N/A	Not applicable	Not required	Not applicable	No
Toxic metals Organic compounds	Leaching from soil source into groundwater at depth	Groundwater Resources: Zone 3 Source Protection Zone	No significant concentrations identified Significant unsaturated zone will aid dispersion	No	N/A	N/A	N/A	Not applicable	Not required	Not applicable	No
Radon	Migration through floor slab and subsequent Inhalation	End Users	Building located within area where basic radon precautions are required	Yes	Yes	Med	LL	Not applicable	Basic radon-protection measures are required within the new buildings.	To be confirmed during construction phase.	No

APPENDIX I

TABLE I-4

SUMMARY OF SOAKAWAY TEST RESULTS

Test Location	*Soil Infiltration Rate (m/s)*	*Remarks*
TP1: test 1	2×10^{-5}	
TP1: test 2	4×10^{-5}	
TP1: test 3	2×10^{-5}	Estimated value
TP2: test 1	3×10^{-5}	
TP2: test 2	4×10^{-5}	
TP2: test 3	3×10^{-5}	
SA101 test 1 SA101 test 2 SA102 test 1 SA102 test 2 SA102 test 3	3×10^{-5} 3×10^{-6} 6×10^{-5} 2×10^{-5} 1×10^{-5}	Values from adjoining site (for reference only)

NOTES:

1. Tests undertaken in trial pits of 1.8 m and 2.0 m depth in weathered Boyne Hollow Chert Formation strata (gravelly sands/sandy gravels with some silty clay pockets/inclusions).

2. Soakaway tests undertaken in compliance with BRE DG365 (2016), apart from TP 1: test 3 – see below.

3. TP 1: test 3 constrained by site access and terminated after 35 mins providing an estimated infiltration value.

4. No groundwater observed within 5 m of ground surface within site during fieldwork period. No groundwater recorded within 4 m of surface during monitoring period: 08.11.2018 to 04.12.2018.

TRIAL PIT RECORDS

KEY

	J	Disturbed Jar Sample	Category B Samples
	G	Soil Sample in Glass Container	
	g	Soil Sample in Glass Vial	
	B	Disturbed Bulk Sample	
	C	"Undisturbed" CBR Mould Sample (denoted Category A: OS-TK/W in BS EN 22475-1:2006)	
	W	Water Sample	
FVT	c_{fv}	Undrained Shear Strength (from hand vane shear vane test)	
	c_{rv}	Undrained Remoulded Shear Strength (from hand vane shear vane test)	
	c_{fv} *	Undrained Shear Strength from Hand Vane Shear Strength Test on block sample dug from pit by excavator	

Notes:

1. All measurement values on record sheets are uncorrected, unless otherwise indicated.
2. For corrected test values, refer to report.
3. Identification and classification of strata is based on the guidance published in the current edition of BS5930 together with BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004, BS EN ISO 14689-1:2003
4. Consistency (soft, firm, stiff etc.) relates to a manual test/inspection on site (in compliance with BS EN ISO 14688-1:2002 Section 5.14)
5. Undrained shear strength (low, medium, high etc.) relates to in situ or laboratory test data and the associated assessed strength of a stratum (in compliance with BS EN ISO 14688-2:2004 Section 5.3 and Table 5).
6. The density of coarse-grained soils is based on SPT N values (or equivalent Dynamic Probe test or CPT data) as outlined in BS5930 and BS EN ISO 14688-2:2004.
7. Rock strength (weak, strong etc.) is based on field identification (and/or strength test data), as outlined in BS EN ISO 14689-1:2003 Table 5.

Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

Trial Pit Record Sheet

Project	Land off Christy's Lane, Shaftesbury	**Hole Ref.**	**TP1**
Date	04/05/2023	**Sheet**	1 of 1
		Job No.	CCL03657
Bearing:	Northeast	**Shoring**	None used
Ground Level	m OD		
Plant	CAT 304	**Stability**	Sides vertical and stable throughout excavation
Co-ordinates			
Trial Pit	A	**Logged by**	GK
Plan	→ B	**Checked by**	[redacted]
	C	**Water**	None encountered

Logged on site during excavation

Depth	Face A	Face B	Face C	Depth
0.15		(1)		0.15
0.50		(2)		0.50
1.10		(3)		1.10
2.00		(4)		2.00
		Base of Pit		

Sampling			Strata		
Sample/Test Depth	Type	Strength (kN/m^2)	Ref. No.	Strata Depth	Description
			1	0.00-0.15	Brown sandy gravel. Gravel is fine to coarse subangular (MADE GROUND)
0.40	J		2	0.15-0.50	Firm consistency black to grey slightly sandy silty clay (MADE GROUND)
0.80	J		3	0.50-1.10	Grey to greenish brown silty sandy GRAVEL with high cobble content. Gravel is fine to coarse subangular (BOYNE HOLLOW CHERT MEMBER)
1.20	J		4	1.10-2.00	Greenish grey to brown gravelly SAND with silty clay inclusions. Gravel is fine to coarse subangular (BOYNE HOLLOW CHERT MEMBER)
1.80	J				

Remarks

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. Symbols and abbreviations are explained on the accompanying key
3. All linear dimensions are in metres unless otherwise stated

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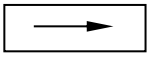
GEOTECHNICAL ENVIRONMENTAL

Trial Pit Record Sheet

Project	Land off Christy's Lane, Shaftesbury	**Hole Ref.**	**TP2**
Date	04/05/2023	**Sheet**	1 of 1
		Job No.	CCL03657
Bearing:	Southeast	**Shoring**	None used
Ground Level	m OD		
Plant	CAT 304	**Stability**	Sides vertical and stable throughout excavation
Co-ordinates			
Trial Pit	A	**Logged by**	GK
Plan	 B	**Checked by**	[redacted]
	C	**Water**	None encountered

Logged on site during excavation

Depth	Face A	Face B	Face C	Depth
		(1)		
0.25				0.25
		(2)		
0.60				0.60
		(3)		
1.80		Base of Pit		1.80

Sampling			Strata		
Sample/Test Depth	Type	Strength (kN/m^2)	Ref. No.	Strata Depth	Description
			1	0.00-0.25	Reddish brown sandy gravel. Gravel is fine to coarse subangular (MADE GROUND)
0.50	J		2	0.25-0.60	Firm to stiff consistency blackish brown slightly sandy silty clay (MADE GROUND)
0.70	JGg		3	0.60-1.80	Brown sandy GRAVEL with high cobble content and sandstone lithorelics. Gravel is fine to coarse subangular (BOYNE HOLLOW CHERT MEMBER)
0.90	J				
1.40	J				

Remarks

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. Symbols and abbreviations are explained on the accompanying key
3. All linear dimensions are in metres unless otherwise stated

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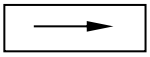
Trial Pit Record Sheet

Project	Land off Christy's Lane, Shaftesbury	**Hole Ref.**	**TP3**
Date	04/05/2023	**Sheet**	1 of 1
		Job No.	CCL03657
Bearing:	Southeast	**Shoring**	None used
Ground Level	m OD		
Plant	CAT 304	**Stability**	Sides vertical and stable throughout excavation
Co-ordinates			
Trial Pit	A	**Logged by**	GK
Plan	 B	**Checked by**	[redacted]
	C	**Water**	None encountered

Logged on site during excavation

Depth	Face A	Face B	Face C	Depth
0.15		(1)		0.15
0.40		(2)		0.40
1.30		(3)		1.30
1.60		(4)		1.60
		Base of Pit		

Sampling			Strata		
Sample/Test Depth	Type	Strength (kN/m^2)	Ref. No.	Strata Depth	Description
			1	0.00-0.15	Brown sandy gravel. Gravel is fine to coarse subangular (MADE GROUND)
			2	0.15-0.40	Firm to stiff consistency blackish brown silty sandy clay (MADE GROUND)
			3	0.40-1.30	Yellowish brown silty sandy GRAVEL with high cobble content. Gravel is fine to coarse subangular (BOYNE HOLLOW CHERT MEMBER)
			4	1.30-1.60	Greyish brown gravelly sand with high cobble content. Gravel is fine to coarse subangular of chert (BOYNE HOLLOW CHERT MEMBER)

Remarks

Trial pit terminated due to dense strata/layer

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. Symbols and abbreviations are explained on the accompanying key
3. All linear dimensions are in metres unless otherwise stated

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GEOTECHNICAL ENVIRONMENTAL

Trial Pit Record Sheet

Project	Land off Christy's Lane, Shaftesbury	**Hole Ref.**	**TP4**
Date	04/05/2023	**Sheet**	1 of 1
		Job No.	CCL03657
Bearing:	Northeast	**Shoring**	None used
Ground Level	m OD		
Plant	CAT 304	**Stability**	Sides vertical and stable throughout excavation
Co-ordinates			
Trial Pit	A	**Logged by**	GK
Plan	→ B	**Checked by**	[redacted]
	C	**Water**	None encountered

Logged on site during excavation

Depth	Face A	Face B	Face C	Depth
		(1)		
0.60				0.60
		(2)		
1.40				1.40
		(3)		
2.30				2.30
2.50		(4)		2.50
		Base of Pit		

Sampling			Strata		
Sample/Test Depth	Type	Strength (kN/m^2)	Ref. No.	Strata Depth	Description
0.40	JGg		1	0.00-0.60	Gravel over brown clayey gravelly sand with rare brick fragments. Gravel is fine to coarse subangular (MADE GROUND)
0.70	J		2	0.60-1.40	Brown slightly clayey silty sandy GRAVEL with high cobble content. Gravel is fine to coarse subangular (BOYNE HOLLOW CHERT MEMBER)
1.30	J				
1.90	J		3	1.40-2.30	Greenish grey to brown silty gravelly SAND with low cobble content and sandstone lithorelics. Gravel is fine to coarse subangular (BOYNE HOLLOW CHERT MEMBER)
2.40	J		4	2.30-2.50	Greenish grey extremely weak SANDSTONE (BOYNE HOLLOW CHERT MEMBER)

Remarks

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. Symbols and abbreviations are explained on the accompanying key
3. All linear dimensions are in metres unless otherwise stated

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GEOTECHNICAL ENVIRONMENTAL

In Situ Percolation Test

Project: Land off Christy's Lane, Shaftesbury

Date: 04/05/2023

Hole Ref.	**TP1**
Sheet	1 of 2
Job No.	**CCL03657**
Test by:	GK
Checked by:	[redacted]

Trial Pit 1 **Test 1**

Depth	2.00	m
Length	1.50	m
Width	0.60	m
Depth to water at start of test	1.00	m
Max Effective Depth	1.00	m
75% Effective Depth	0.75	m
25% Effective Depth	0.25	m

Water Level Measurements

Time at Start of Test	Time (Minutes)	Depth to Water (metres)	Effective Depth (m)
10:57	0	1.00	1.00
	5	1.10	0.90
	10	1.18	0.82
	20	1.27	0.73
	35	1.38	0.62
	60	1.48	0.52
	90	1.59	0.41
	115	1.68	0.32
	135	1.77	0.23
75% Effective Depth -	14	-	0.75
25% Effective Depth -	130	-	0.25

Outflow Volume

Volume outflowing between 75% & 25% effective depth:

V_{p75} = 0.45 m^3

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and the base.

a_{p50} = 3.00 m^2

Time for outflow

tp = 116 mins

Soil Infiltration Rate as defined in BRE DG365 (2016)

$f = V_{p75} / a_{p50} * tp$

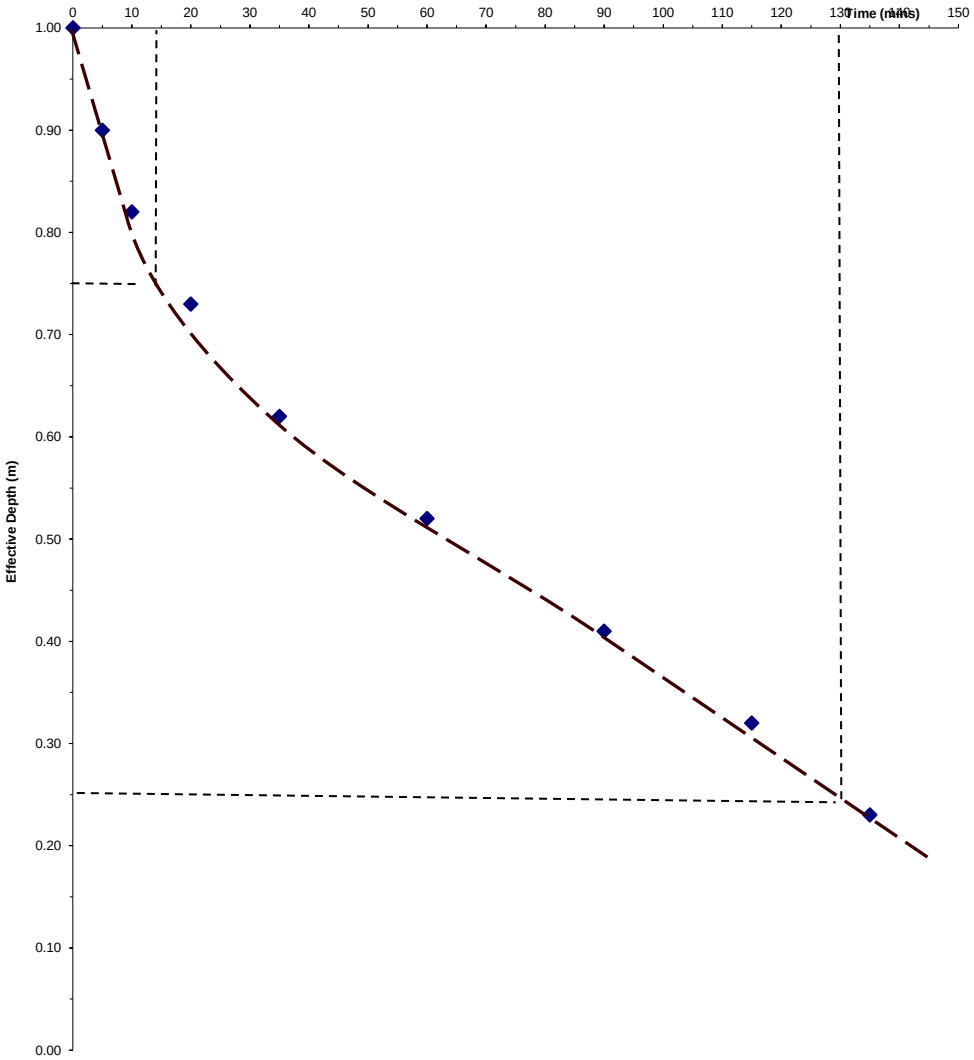
f = 2.2E-05 m/sec

Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

In Situ Percolation Test		Hole Ref.	TP1
Project: Land off Christy's Lane, Shaftesbury		Sheet	2 of 2
		Job No.	CCL03657
Date: 04/05/2023		Test by:	GK
		Checked by:	[redacted]

Trial Pit 1 **Test 1**

Infiltration Rate



Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

In Situ Percolation Test

Project:	Land off Christy's Lane, Shaftesbury
Date:	05/04/2023

Hole Ref.	**TP1**
Sheet	1 of 2
Job No.	**CCL03657**
Test by:	GK
Checked by:	[redacted]

Trial Pit 1 **Test 2**

Depth	2.00	m
Length	1.50	m
Width	0.60	m
Depth to water at start of test	1.00	m
Max Effective Depth	1.00	m
75% Effective Depth	0.75	m
25% Effective Depth	0.25	m

Water Level Measurements

Time at Start of Test	Time (Minutes)	Depth to Water (metres)	Effective Depth (m)
13:15	0	1.00	1.00
	5	1.04	0.96
	20	1.17	0.83
	60	1.51	0.49
	90	1.70	0.30
	100	1.79	0.21
75% Effective Depth -	30	-	0.75
25% Effective Depth -	96	-	0.25

Outflow Volume

Volume outflowing between 75% & 25% effective depth:

V_{p75} = 0.45 m^3

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and the base.

a_{p50} = 3.00 m^2

Time for outflow

tp = 66 mins

Soil Infiltration Rate as defined in BRE DG365 (2016)

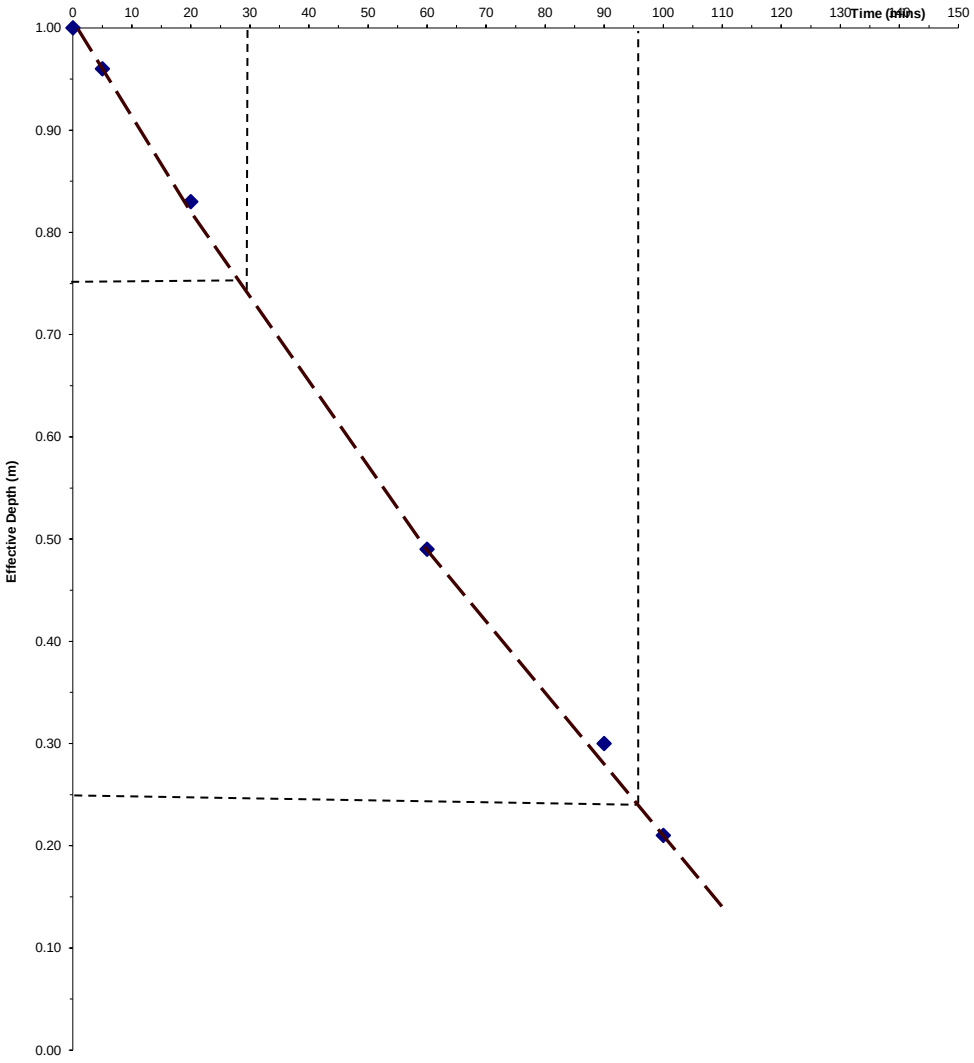
$f = V_{p75} / a_{p50} * tp$

f = 3.8E-05 m/sec

Crossfield CONSULTING GEOTECHNICAL ENVIRONMENTAL	**In Situ Percolation Test**	**Hole Ref.** **TP1**
	Project: Land off Christy's Lane, Shaftesbury	**Sheet** 2 of 2
		Job No. **CCL03657**
	Date: 05/04/2023	**Test by:** GK
		Checked by: [redacted]

Trial Pit 1 **Test 2**

Infiltration Rate



Crossfield CONSULTING GEOTECHNICAL ENVIRONMENTAL	In Situ Percolation Test	Hole Ref.	TP1
	Project: Land off Christy's Lane, Shaftesbury	Sheet	1 of 2
		Job No.	CCL03657
	Date: 05/04/2023	Test by:	GK
		Checked by:	[redacted]

Trial Pit 1 **Test 3**

Depth	2.00	m
Length	1.50	m
Width	0.60	m
Depth to water at start of test	1.00	m
Max Effective Depth	1.00	m
75% Effective Depth	0.75	m
25% Effective Depth	0.25	m

Water Level Measurements

Time at Start of Test	Time (Minutes)	Depth to Water (metres)	Effective Depth (m)
14:57	0	1.00	1.00
	5	1.04	0.96
	35	1.29	0.71
75% Effective Depth -	29	-	0.75
25% Effective Depth -	143	-	0.25

Outflow Volume

Volume outflowing between 75% & 25% effective depth:

V_{p75} = 0.45 m^3

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and the base.

a_{p50} = 3.00 m^2

Time for outflow

tp = 114 mins

Soil Infiltration Rate f = V_{p75} / a_{p50} * tp

as defined in

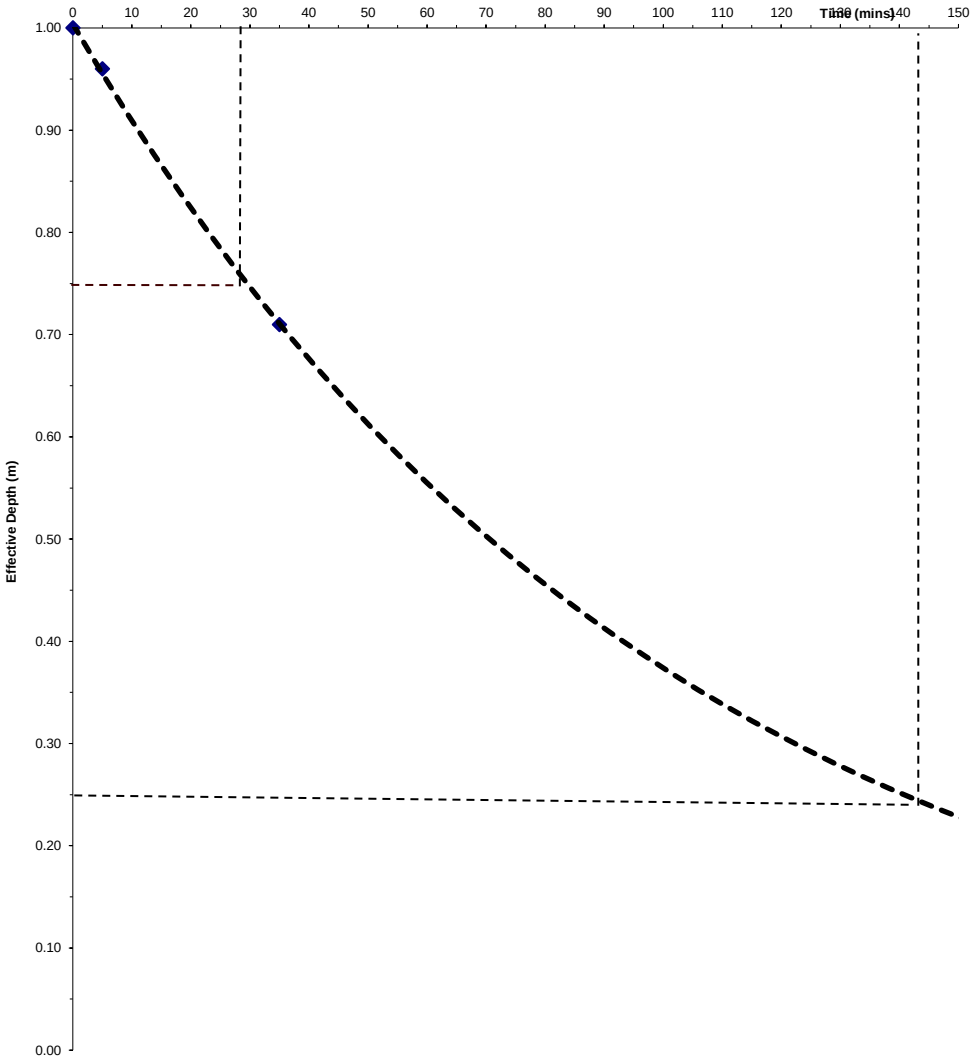
BRE DG365 (2016) **f = 2.2E-05 m/sec** Note: estimated value

Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

In Situ Percolation Test		Hole Ref.	TP1
Project: Land off Christy's Lane, Shaftesbury		Sheet	2 of 2
		Job No.	CCL03657
Date: 05/04/2023		Test by:	GK
		Checked by:	[redacted]

Trial Pit 1 **Test 3**

Infiltration Rate



Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

In Situ Percolation Test

Project:	Land off Christy's Lane, Shaftesbury
Date:	04/05/2023

Hole Ref.	**TP2**
Sheet	1 of 2
Job No.	**CCL03657**
Test by:	GK
Checked by:	[redacted]

Trial Pit 2 **Test 1**

Depth	1.80	m
Length	1.80	m
Width	0.60	m
Depth to water at start of test	0.95	m
Max Effective Depth	0.85	m
75% Effective Depth	0.64	m
25% Effective Depth	0.21	m

Water Level Measurements

Time at Start of Test	Time (Minutes)	Depth to Water (metres)	Effective Depth (m)
10:38	0	0.95	0.85
	5	1.11	0.69
	10	1.25	0.55
	15	1.33	0.47
	25	1.42	0.38
	40	1.48	0.32
	55	1.52	0.28
	80	1.57	0.23
	110	1.64	0.16
75% Effective Depth -	6	-	0.64
25% Effective Depth -	85	-	0.21

Outflow Volume

Volume outflowing between 75% & 25% effective depth:

V_{p75} = 0.46 m^3

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and the base.

a_{p50} = 3.12 m^2

Time for outflow

tp = 79 mins

Soil Infiltration Rate as defined in BRE DG365 (2016)

$f = V_{p75} / a_{p50} * tp$

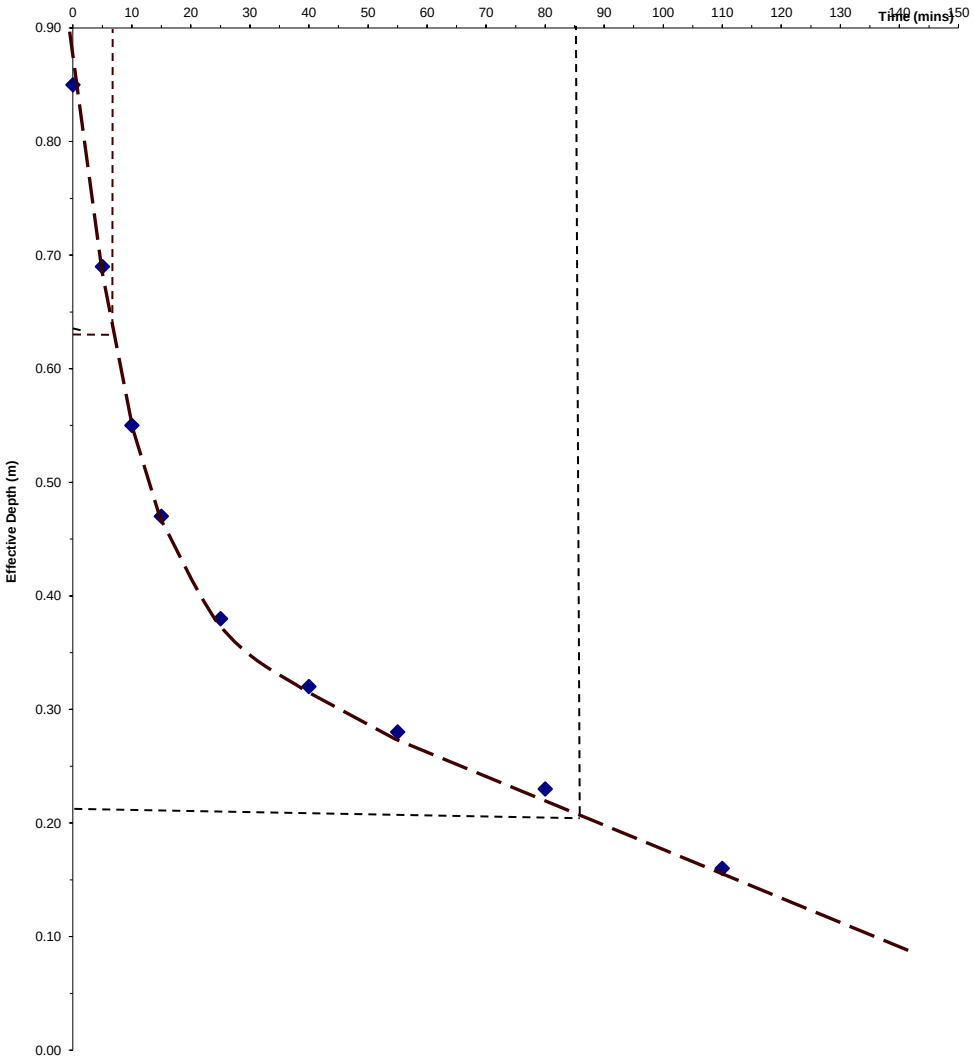
f = 3.1E-05 m/sec

Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

In Situ Percolation Test		Hole Ref.	TP2
Project: Land off Christy's Lane, Shaftesbury		**Sheet**	2 of 2
		Job No.	CCL03657
Date: 04/05/2023		**Test by:**	GK
		Checked by:	[redacted]

Trial Pit 2 **Test 1**

Infiltration Rate



Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

In Situ Percolation Test

Project: Land off Christy's Lane, Shaftesbury

Date: 04/05/2023

Hole Ref.	**TP2**
Sheet	1 of 2
Job No.	**CCL03657**
Test by:	GK
Checked by:	[redacted]

Trial Pit 2 **Test 2**

Depth	1.80	m
Length	1.80	m
Width	0.60	m
Depth to water at start of test	0.90	m
Max Effective Depth	0.90	m
75% Effective Depth	0.68	m
25% Effective Depth	0.23	m

Water Level Measurements

Time at Start of Test	Time (Minutes)	Depth to Water (metres)	Effective Depth (m)
12:30	0	0.90	0.90
	5	1.05	0.75
	20	1.23	0.57
	40	1.45	0.35
	60	1.52	0.28
	80	1.57	0.23
	90	1.60	0.20
75% Effective Depth -	10	-	0.68
25% Effective Depth -	77	-	0.23

Outflow Volume

Volume outflowing between 75% & 25% effective depth:

V_{p75} = 0.49 m^3

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and the base.

a_{p50} = 3.24 m^2

Time for outflow

tp = 67 mins

Soil Infiltration Rate as defined in BRE DG365 (2016)

$f = V_{p75} / a_{p50} * tp$

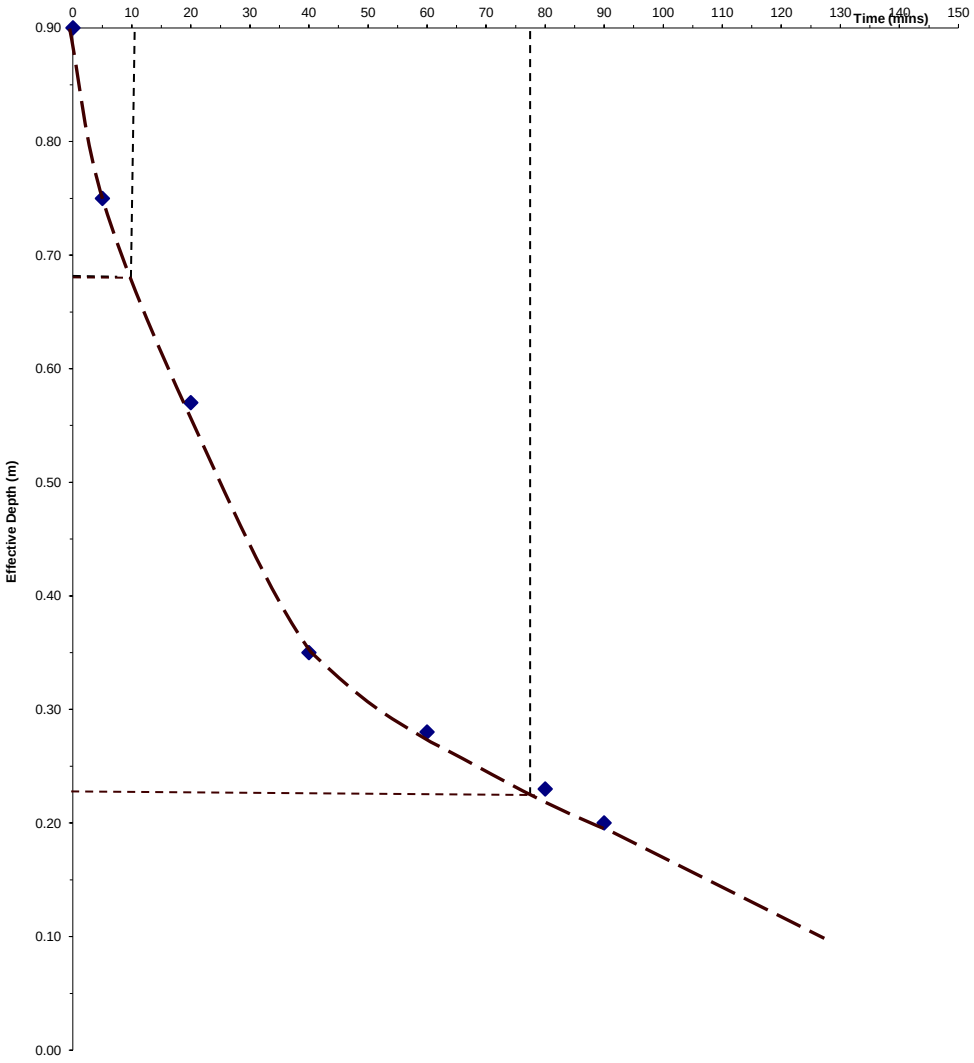
f = 3.7E-05 m/sec

Crossfield CONSULTING GEOTECHNICAL ENVIRONMENTAL

In Situ Percolation Test		Hole Ref.	TP2
Project: Land off Christy's Lane, Shaftesbury		Sheet	2 of 2
		Job No.	CCL03657
Date: 04/05/2023		Test by:	GK
		Checked by:	[redacted]

Trial Pit 2 **Test 2**

Infiltration Rate



Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

In Situ Percolation Test

Project:	Land off Christy's Lane, Shaftesbury
Date:	04/05/2023

Hole Ref.	**TP2**
Sheet	1 of 2
Job No.	**CCL03657**
Test by:	GK
Checked by:	[redacted]

Trial Pit 2 **Test 3**

Depth	1.80	m
Length	1.80	m
Width	0.60	m
Depth to water at start of test	0.90	m
Max Effective Depth	0.90	m
75% Effective Depth	0.68	m
25% Effective Depth	0.23	m

Water Level Measurements

Time at Start of Test	Time (Minutes)	Depth to Water (metres)	Effective Depth (m)
14:05	0	0.90	0.90
	5	1.12	0.68
	25	1.34	0.46
	40	1.43	0.37
	60	1.49	0.31
	100	1.56	0.24
	115	1.60	0.20
	135	1.62	0.18
75% Effective Depth -	5	-	0.68
25% Effective Depth -	100	-	0.23

Outflow Volume

Volume outflowing between 75% & 25% effective depth:

V_{p75} = 0.49 m^3

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and the base.

a_{p50} = 3.24 m^2

Time for outflow

tp = 95 mins

Soil Infiltration Rate as defined in BRE DG365 (2016)

$f = V_{p75} / a_{p50} * tp$

f = 2.6E-05 m/sec

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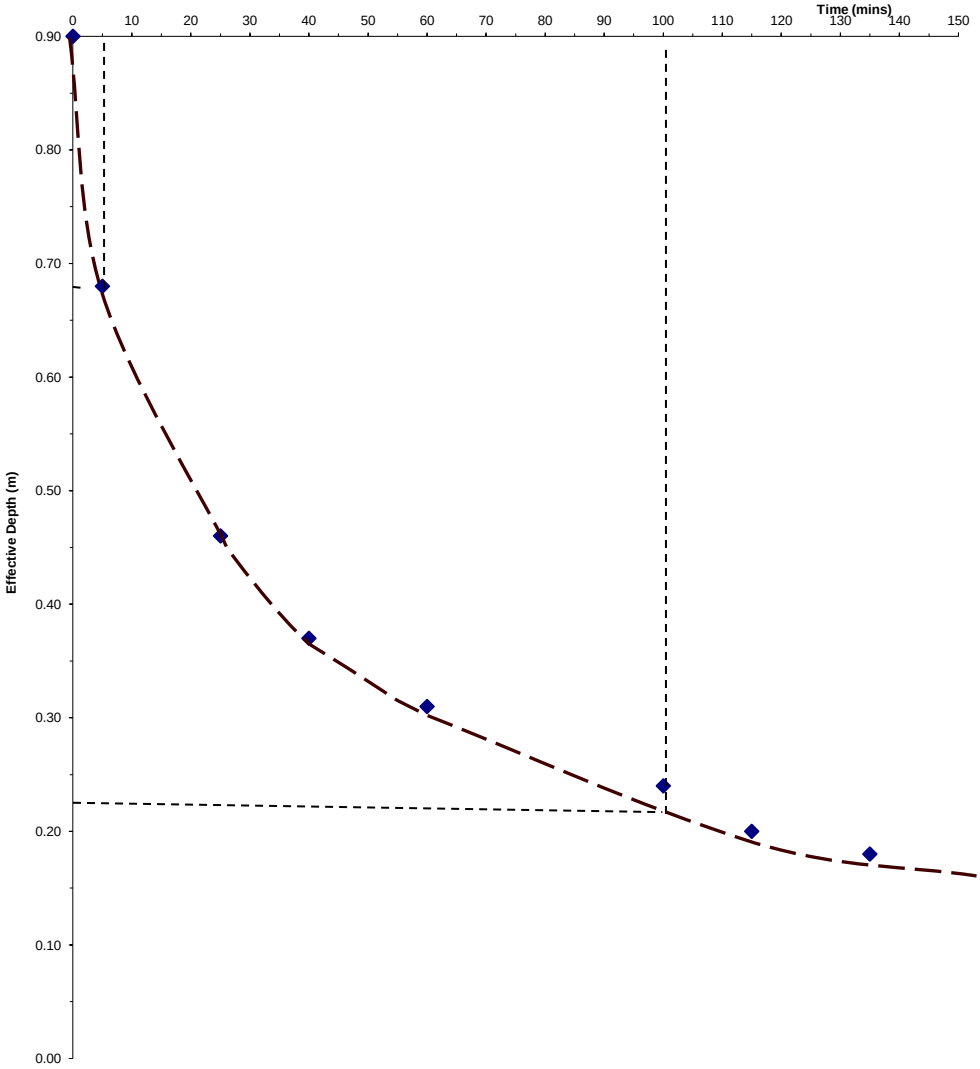
In Situ Percolation Test		Hole Ref.	TP2
Project: Land off Christy's Lane, Shaftesbury		Sheet	2 of 2
		Job No.	CCL03657
Date: 04/05/2023		Test by:	GK
		Checked by:	[redacted]

Trial Pit 2 **Test 3**

Infiltration Rate



DYNAMIC SAMPLE RECORDS

KEY

Sampling

	J	Disturbed Jar Sample
	G	Jar Sample in Glass Container
	g	Soil Sample in Glass Vial
	W	Water Sample
	IC	Nett sample recovery ratio (ratio of length of recovered sample to length of sample run)

In Situ Measurements

FVT	c_{fv}	Undrained Shear Strength (from hand vane shear vane test)
	c_{rv}	Undrained Remoulded Shear Strength (from hand vane shear vane test)
	c_{fv} *	Hand Vane Shear Strength Test (on Category A: OS-TK/W soil sample recovered in window sampler)
	S	Standard Penetration Test (SPT: split spoon sampler)
	SPT(C)	SPT carried out with a 60° cone
	'N'	'N' Value from SPT test
	N_{10}	Dynamic Probe Test: Number of blows to drive 100 mm
DPH	N_{H10}	Dynamic Probe Test: Heavy (30 kg mass & 500 mm fall)
DPSH-A	N_{SHA10}	Dynamic Probe Test: Super-Heavy A (63.5 kg mass & 500 mm fall)
DPSH-B	N_{SHB10}	Dynamic Probe Test: Super-Heavy B (63.5 kg mass & 750 mm fall)
	$\frac{x}{y\ mm}$	x Blows per y Driving Distance (for non-standard SPT or DP driving distance)
	T	Torque (max) required to turn rods (unit: Nm, unless otherwise shown)

Notes:

1. All measurement values on record sheets are uncorrected, unless otherwise indicated.
2. For corrected test values, refer to report.
3. Identification and classification of strata is based on the guidance published in the current edition of BS5930 together with BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003
4. Consistency (soft, firm, stiff etc) relates to a manual test/inspection on site (in compliance with BS EN ISO 14688-1:2002 Section 5.14).
5. Undrained shear strength (low, medium, high etc) relates to in situ or laboratory test data and the associated assessed strength of a stratum (in compliance with BS EN ISO 14688-2:2004 Section 5.3 and Table 5).
6. The density of coarse-grained soils is based on SPT N values (or equivalent Dynamic Probe test or CPT data) as outlined in BS5930 and BS EN ISO 14688-2:2004.
7. Rock strength (weak, strong etc) is based on field identification (and/or strength test data), as outlined in BS EN ISO 14689-1:2003 Table 5.

BOREHOLE & DRILLHOLE RECORDS - LEGENDS KEY SHEET

Legend - Strata Encountered in Exploratory Hole

Soil	Rock		
	Sedimentary	Igneous	Metamorphic
Made Ground	Mudstone	Fine-grained	Fine-grained
Clay	Shale	Medium-grained	Medium-grained
Silt	Siltstone	Coarse-grained	Coarse-grained
Sand	Sandstone		
Gravel	Limestone		
Peat/Topsoil	Chalk		
Organic Sand	Coal		
Organic Clay	Conglomerate		

Legend - Backfill to Borehole and Standpipe Installations

Backfill	Installations
Soil arisings	Concrete Cover Over Standpipe
Bentonite	Plain Standpipe - Bentonite Surround
Cement-based Grout	Perforated Standpipe - Geotextile and Granular Filter Surround
Gravel	Perforated Standpipe End Geotextile and Granular Filter Surround

Notes:

1. A combination of the strata symbols are indicative of mixed soil types.

2. The response zone of a standpipe refers to the section of perforated pipe within a granular surround, where substances may freely enter the standpipe from the surrounding strata.

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GEOTECHNICAL ENVIRONMENTAL

Dynamic Sample Record Sheet

Project:	Land off Christy's Lane, Shaftesbury	**Hole Ref.**	**DS1**
Date:	04/05/2023	**Sheet**	1 of 1
		Job No.	CCL03657
Contractor	RGI Ltd	**Equipment**	Premier Compact 110
Method	0.0 m to 1.0 m dynamic sampling	**Ground Level.**	m OD
Boring Diameter	100 mm	**Co-ordinates**	
		Logged by:	GK — Logged on site during drilling operations
		Checked by:	[redacted]

Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.
					Grey sandy fine to coarse sub-angular gravel surfacing (MADE GROUND)	0.15			
0.30	GgJ				Firm consistency brown slightly gravelly silty clay with brick fragments. Gravel is fine to coarse subangular (MADE GROUND)	0.50			
0.70	J				Very dense greenish grey to brown sandy clayey fine to coarse sub-angular GRAVEL (BOYNE HOLLOW CHERT MEMBER)				
1.00-1.43	S	-	-	N=50 275 mm		1.00			
					End of Hole				

Core Recovery		Groundwater				Additional Tests		
Depth	Recovery	Hole Depth	Strike Depth	Water Depth	Observations	Test type	Test Depth	Test Value
0.00-1.00	100%	1.00	-	-				

Remarks

Further progress precluded by very dense strata

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. The depths to strata change are approximate only
3. Symbols and abbreviations are explained on the accompanying key
4. All linear dimensions are in metres unless otherwise stated
5. Undrained shear strength test value given in kN/m^2

Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

Dynamic Sample Record Sheet

Project:	Land off Christy's Lane, Shaftesbury	**Hole Ref.**	**DS2**
Date:	04/05/2023	**Sheet**	1 of 1
		Job No.	CCL03657
Contractor	RGI Ltd	**Equipment**	Premier Compact 110
Method	0.0 m to 1.0 m dynamic sampling	**Ground Level.**	m OD
Boring Diameter	100 mm	**Co-ordinates**	
		Logged by:	GK — Logged on site during drilling operations
		Checked by:	[redacted]

Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.
					Grey sandy coarse sub-angular gravel surfacing (MADE GROUND)	0.10			
0.40	GgJ				Stiff consistency brown sandy silty clay (MADE GROUND)				
0.70	J				Firm to stiff consistency greyish brown slightly gravelly very sandy CLAY/very dense slightly gravelly very clayey SAND (BOYNE HOLLOW CHERT MEMBER)	0.60			
1.00-1.33	S	-	-	N=50 180 mm		1.00			
					End of Hole				

Core Recovery		Groundwater				Additional Tests		
Depth	Recovery	Hole Depth	Strike Depth	Water Depth	Observations	Test type	Test Depth	Test Value
0.00-1.00	100%	1.00	-	-				

Remarks

Further progress precluded by very dense strata

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. The depths to strata change are approximate only
3. Symbols and abbreviations are explained on the accompanying key
4. All linear dimensions are in metres unless otherwise stated
5. Undrained shear strength test value given in kN/m^2

Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

Dynamic Sample Record Sheet

Project:	Land off Christy's Lane, Shaftesbury	**Hole Ref.**	**DS3**
Date:	04/05/2023	**Sheet**	1 of 1
		Job No.	CCL03657
Contractor	RGI Ltd	**Equipment**	Premier Compact 110
Method	0.0 m to 5.0 m dynamic sampling	**Ground Level.**	m OD
Boring Diameter	100 mm	**Co-ordinates**	
		Logged by:	GK — Logged on site during drilling operations
		Checked by:	[redacted]

Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.
					Multi-coloured fine to coarse sub-angular to sub-rounded gravel surfacing with brown fragments (MADE GROUND)				
						0.30			
0.40	GgJ				Firm consistency brown sandy clay (MADE GROUND)				
						0.50			
0.60	J				Medium dense greenish grey slightly clayey sandy fine to coarse sub-angular GRAVEL (BOYNE HOLLOW CHERT MEMBER)				
1.00-1.45	S	-	-	N=16					
1.00	J								
1.60	J					1.50			
					Firm to stiff consistency slightly gravelly very sandy CLAY/medium dense slightly gravelly very clayey SAND (BOYNE HOLLOW CHERT MEMBER)				
2.00-2.45	S	-	-	N=12					
						2.30			
2.50	J				Firm to stiff and stiff consistency brown slightly gravelly very sandy CLAY/medium dense slightly gravelly very clayey SAND (BOYNE HOLLOW CHERT MEMBER)				
3.00-3.45	S	-	-	N=20					
						3.50			
					Medium dense greyish brown clayey sandy fine to coarse sub-angular GRAVEL with chert				
4.00-4.45	S	-	-	N=29					
5.00-5.45	S	-	-	N=14	End of Hole	5.00			

Core Recovery

Depth	Recovery
0.00-1.00	100%
1.00-2.00	80%
2.00-3.00	80%
3.00-4.00	50%
4.00-5.00	65%

Groundwater

Hole Depth	Strike Depth	Water Depth	Observations
5.00	-	-	

Additional Tests

Test type	Test Depth	Test Value

Remarks

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. The depths to strata change are approximate only
3. Symbols and abbreviations are explained on the accompanying key
4. All linear dimensions are in metres unless otherwise stated
5. Undrained shear strength test value given in kN/m^2

Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

Dynamic Sample Record Sheet

Project:	Land off Christy's Lane, Shaftesbury	**Hole Ref.**	**DS4**
Date:	04/05/2023	**Sheet**	1 of 1
		Job No.	CCL03657
Contractor	RGI Ltd	**Equipment**	Premier Compact 110
Method	0.0 m to 2.0 m dynamic sampling	**Ground Level.**	m OD
Boring Diameter	100 mm	**Co-ordinates**	
		Logged by:	GK — Logged on site during drilling operations
		Checked by:	[redacted]

Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.
					Greyish brown sandy fine to coarse sub-angular gravel surfacing (MADE GROUND)	0.20			
0.50	GgJ				Firm to stiff consistency slightly sandy slightly gravelly silty clay. Gravel is fine to coarse and sub-angular (MADE GROUND)	0.70			
0.90	J				Loose greyish brown sandy clayey fine to coarse sub-angular GRAVEL with medium cobble content				
1.00-1.45	S	-	-	N=7	(BOYNE HOLLOW CHERT MEMBER)	1.20			
1.50	J				Very dense grey and orangish brown slightly gravelly very clayey SAND. Gravel is fine to coarse and sub-angular (BOYNE HOLLOW CHERT MEMBER)				
1.80	J								
2.00-2.38	S	-	-	N=50 285 mm		2.00			
					End of Hole				

Core Recovery

Depth	Recovery
0.00-1.00	100%
1.00-2.00	85%

Groundwater

Hole Depth	Strike Depth	Water Depth	Observations
2.00	-	-	

Additional Tests

Test type	Test Depth	Test Value

Remarks

Further progress precluded by very dense strata

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. The depths to strata change are approximate only
3. Symbols and abbreviations are explained on the accompanying key
4. All linear dimensions are in metres unless otherwise stated
5. Undrained shear strength test value given in kN/m^2

Crossfield CONSULTING
GEOTECHNICAL ENVIRONMENTAL

Dynamic Sample Record Sheet

Project:	Land off Christy's Lane, Shaftesbury	**Hole Ref.**	**DS5**
Date:	04/05/2023	**Sheet**	1 of 1
		Job No.	CCL03657
Contractor	RGI Ltd	**Equipment**	Premier Compact 110
Method	0.0 m to 4.0 m dynamic sampling	**Ground Level.**	m OD
Boring Diameter	100 mm	**Co-ordinates**	
		Logged by:	GK — Logged on site during drilling operations
		Checked by:	[redacted]

Sample Depth	Sample or Test	Casing Depth	Water Depth	Test Value	Description	Depth	Legend	Backfill	Level O.D.
					Brown sandy fine to coarse sub-angular gravel surfacing (MADE GROUND)	0.20			
					Stiff consistency brown sandy silty clay (MADE GROUND)				
1.00-1.45	S	-	-	N=13		1.00			
1.20	J				Medium dense greyish brown slightly clayey sandy fine to coarse sub-angular GRAVEL (BOYNE HOLLOW CHERT MEMBER)	1.40			
1.50	J				Firm to stiff consistency brown slightly sandy slightly gravelly CLAY (BOYNE HOLLOW CHERT MEMBER)				
2.00-2.45	S	-	-	N=4*					
2.30	J								
						2.80			
3.00-3.45	S	-	-	N=30	Dense becoming very dense greyish brown slightly clayey sandy fine to coarse sub-angular GRAVEL with chert and sandstone fragments (BOYNE HOLLOW CHERT MEMBER)				
3.50	J								
4.00-4.44	S	-	-	N=50 / 290 mm		4.00			
					End of Hole				

Core Recovery

Depth	Recovery
0.00-1.00	20%
1.00-2.00	90%
2.00-3.00	60%
3.00-4.00	60%

Groundwater

Hole Depth	Strike Depth	Water Depth	Observations
4.00	-	-	

Additional Tests

Test type	Test Depth	Test Value

Remarks

Further progress precluded by very dense strata

* Possible sample disturbance

Notes

1. All logging and sampling in accordance with BS 5930:2015+A1:2020
2. The depths to strata change are approximate only
3. Symbols and abbreviations are explained on the accompanying key
4. All linear dimensions are in metres unless otherwise stated
5. Undrained shear strength test value given in kN/m^2

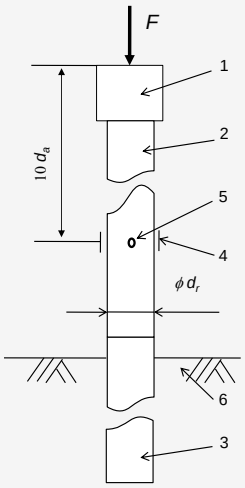
SPT Calibration Report

Hammer Energy Measurement Report

Type of Hammer		PREMIER
Test No		EQU2022_266
Client		RGI
Test Depth (m)		7.30
Mass of hammer	m =	63.5kg
Falling height	h =	0.76m
E_{theor} =	$m \times g \times h$ =	473J

Characteristics of the instrumented rod

Diameter	d_r =	0.052 m
Length of instrumented rod		0.558 m
Area	A =	11.61 cm²
Modulus	E_a =	206843 MPa



Key

1 Anvil
2 Part of instrumented rod
3 Drive Rod
4 Strain Gauge
5 Accelerometer
6 Ground

F Force
d_r Diameter of rod

Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

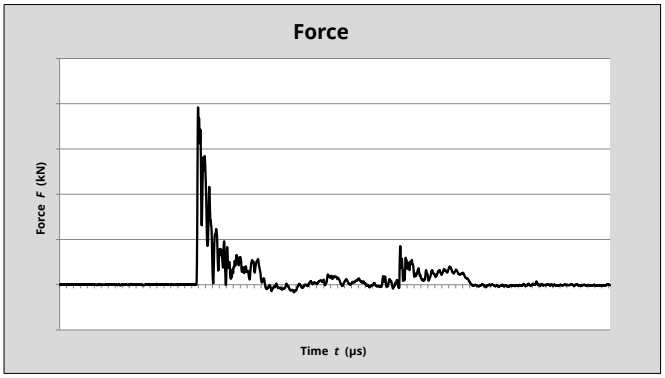
DATE OF TEST	VALID UNTIL	HAMMER ID
12/09/2022	12/09/2023	RGI13 110-123

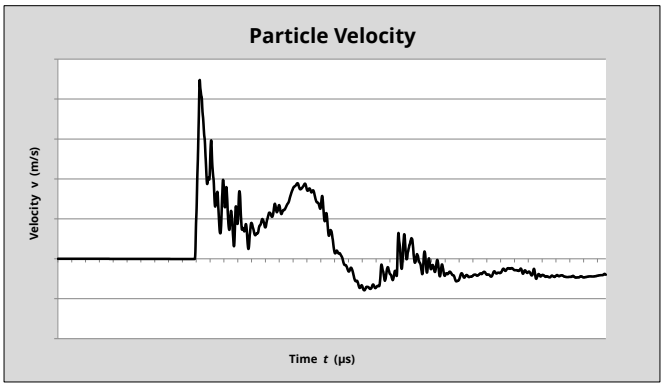
E_{meas} = **0.403** kN-m

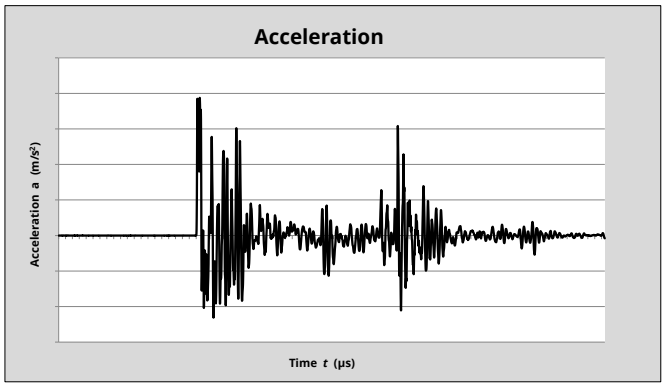
E_{theor} = **0.473** kN-m

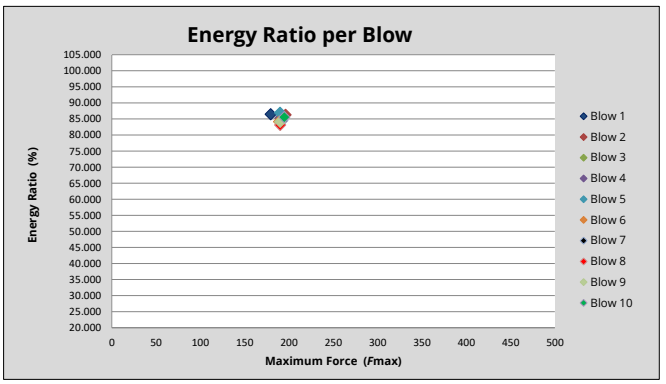
Comments

Energy Ratio (Er) = $\frac{E_{meas}}{E_{theor}}$ **85.23%**



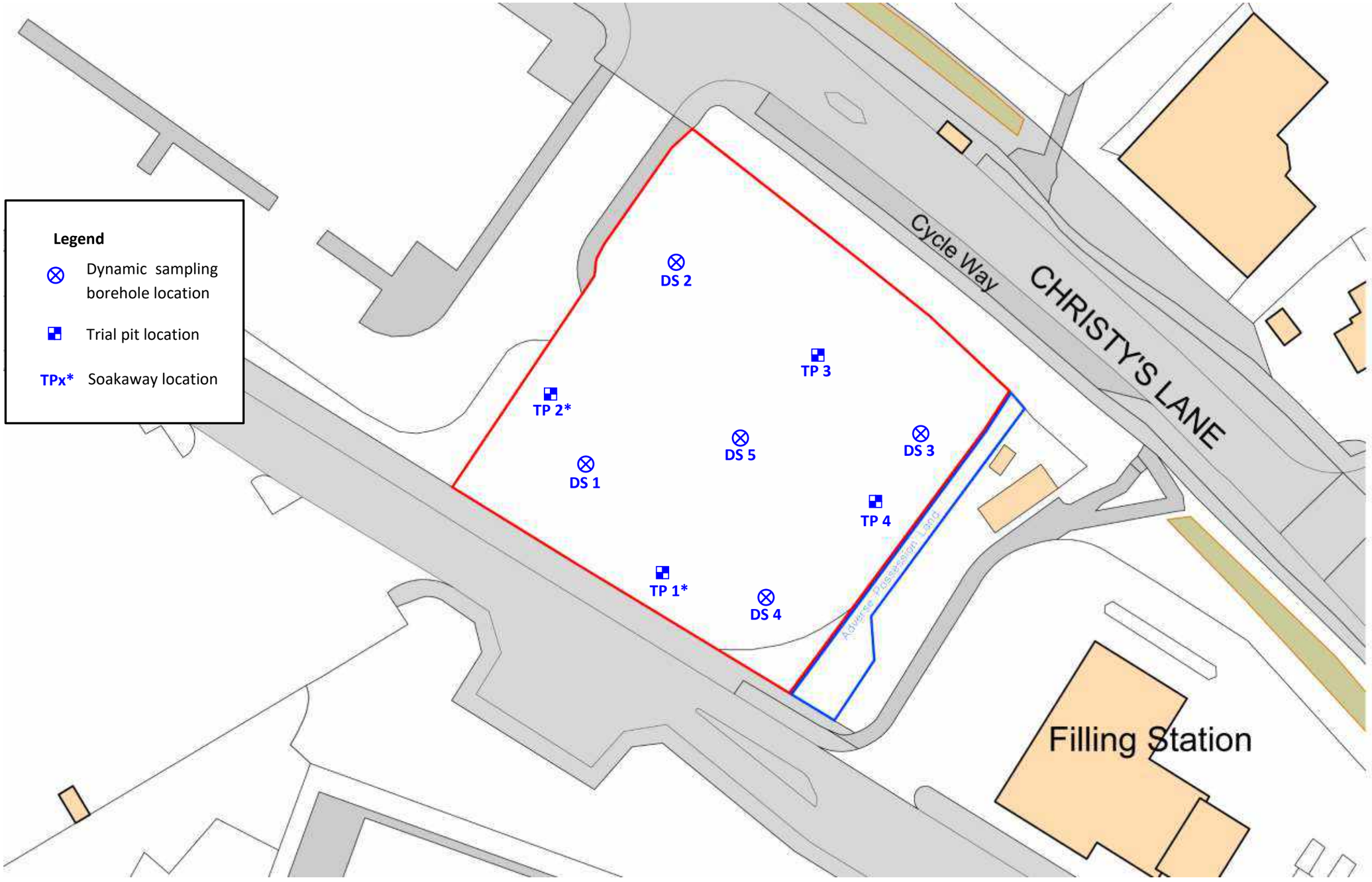






Equipe SPT Analyzer Operator	Certificate prepared by	Certificate checked by	Certificate date
AF	[redacted]	[redacted]	20/09/2022

 Equipe Group, The Paddocks, Home Farm Offices, The Upton Estate, Banbury, Oxfordshire, OX15 6HU
Tel: +44 (0)1295 670990 Fax: +44 (0)1295 678232 Email: info@equipegroup.com



EXPLORATORY HOLE LOCATION PLAN

Scale 1:500

Reproduced from drawing No. 22/SW035/TP01 by Planning Issues dated April 2023

Appendix D CCTV drainage survey report

CCTV SURVEYS

HIGH PRESSURE JETTING

MAN ENTRY SURVEYS

RELINING & REPAIRS

PILING SURVEYS

CHIMNEY SURVEYS

UTILITY SURVEYS LTD.

5 SUFFOLK ROAD
MALDON
ESSEX
CM9 6AX
Telephone: 07971 910370

CCTV REPORT

CLIENT	CHURCHILL RETIREMENT LIVING
LOCATION	LIDL SITE CHRISTYS LANE SHAFTESBURY DORSET SP7 8TL
DATE	28/04/2023 & 15/05/2023
REF	071510

CONTENTS

1. GENERAL INFORMATION……3
2. CONTACT INFORMATION……3
3. UTILITY SURVEYS LTD CONTACT DETAILS……..3
4. SITE DESCRIPTION……...4
5. SURVEY BRIEF……...…5
6. SURVEY TECHNIQUES…….7
7. INDIVIDUAL INSPECTION REPORT……...8

REGISTER OF APPENDICES

A. MANHOLE INSPECTION REPORT
B. COPIES OF SITE HAND WRITTEN DAILY RECORD SHEETS
C. ANNOTATED SITE DRAWINGS

GENERAL INFORMATION

Utility Surveys Ltd have been appointed by Churchill Retirement Living to undertake a Sewer Condition Survey at the location identified. This survey commenced on 28/04/2023.

CONTACT INFORMATION

SITE ADDRESS: **LIDL SITE** **CHRISTYS LANE** **SHAFTESBURY** **DORSET** **SP7 8TL**	**SITE CONTACT: N/A** **CONTACT NO:** **EMAIL:**
CLIENT DETAILS: **CHURCHILL RETIREMENT LIVING** **CHURCHILL HOUSE** **PARKSIDE** **RINGWOOD** **BH24 3SG**	**CONTACT: WES SANDERSON** **CONTACT NO:** [redacted] **EMAIL:**

UTILITY SURVEYS LTD CONTACT DETAILS

OFFICE	**SIMON GARDINER** [redacted]
RIG MANAGER	**SIMON GARDINER**

SITE DESCRIPTION

Site Description

DEVELOPMENT SITE

Site Boundaries

CLEARLY DEFINED ON SUPPLIED DRAWINGS

SURVEY BRIEF

Sewer Condition Inspection Survey

The Purpose of the Sewer Condition Inspection Survey was to establish the location and extent of foul and/ or surface water drainage systems and to document their condition prior to any further works.

- A full condition survey can only be produced if precleansing / jetting is carried out in conjunction with the CCTV survey.

- If precleansing is not carried out at the time of the survey further faults and conditional defects may be present but not recorded in this report.

In addition Utility Surveys Ltd have;

- Attempted to investigate all agreed areas, although if not all could be fully accessed (see Daily Record Sheet).

- Produced a report to establish the location and extent of foul and surface water drainage systems and to document their condition prior to any further works.

- Provided the basic information from which a remediation or management plan can be instigated.

- Highlighted the requirement for urgent action to repair or remediation works to the surveyed drainage system.

- Incorporated in the results any additional manholes/ drainage found, which may have been buried, obscured or not identified in the original scope of works.

Agreed Restrictions and Exclusions

This report is based upon a Sewer Condition Inspection Survey of an unfamiliar site.

During the course of the survey all reasonable efforts were made to identify and access all Manholes and foul/ surface drainage/ outfall, throughout the site.

Some installations/ areas may not have been inspected due to access and or safety reasons (e.g. Wet Wells, Large Unventilated Tanks, Traffic Management Situations). Unless an accepted safe system of work has been devised.

Access may not have been gained to several areas of the site due to conditions outside the control of the client or contractor, any such areas have been documented within this report (see Daily Record Sheet).

Any diagrams/ CAD drawings in the report are not to be scaled and are illustrative only to indicate approximate locations.

Manhole covers will not be lifted if:

a) There is a danger of damaging surrounding flooring or finishes.

b) They are covered, i.e. under fitted carpets, flooring, tiling or paving etc.

c) Under fittings, fixtures, fencing, equipment etc.

Buried manholes will be located, if possible, position marked. If instructed, excavated in soft ground only up to a depth of 350mm with temporary reinstatement.

No allowance has been made for any precleansing unless stated in the quotation.

Full and free access to all areas affected is to be arranged by the instructing party.

SURVEY TECHNIQUES

The areas set out within the survey brief underwent inspection for a Sewer Condition Inspection Survey each area within the agreed scope of works was surveyed for location extent and condition of foul and/ or surface water drainage systems and CCTV footage gathered for confirmation. Every reasonable effort was made to investigate all aspects of the drainage system. Additional photographs were taken where relevant to the inspection.

There were no deviations from the agreed scope of works.

This Sewer Condition Inspection Survey was carried out in accordance with the Utility Surveys Ltd documented 'in-house' procedure 820 'Code of Working Practice' based on National Sewerage Association guidance.
The Sewer Condition Inspection Survey Report states information recorded at the time of survey only, based on visual and CCTV assessment in accordance with sewer classification codings issued by WRC, incorporating the following inspection criteria:

CONDITION of pipe work
LOCATION of pipe work
EXTENT of the pipe work

A defect grade description has been provided for the identification of defective pipe work.

Changes to any of the above criteria shall necessitate the need for reassessment

These gradings and the reports can be used to form the basis of a planned preventative maintenance programme. This can be the subject of further discussions with our technical support team.

Drainage Report

Prepared For

CHURCHILL RETIREMENT LIVING
PARKSIDE
RINGWOOD
HAMPSHIRE
BH24 3SG

Site

LIDL SITE
CHRISTYS LANE
SHAFTSBURY
DORSET
SP7 8TL

UTILITY SURVEYS LIMITED
Surveyor: Simon Gardiner
simon@utilitysurveysltd.co.uk

Total Defects for Project

14	1	33	4	0

Total DRB Grades for Project

1	6	1

071510 CHRISTYS LANE SHAFTSBURY - CCTV Survey Report : 28/04/23

Name :	UTILITY SURVEYS LIMITED
Contact :	SIMON GARDINER
Location :	5 SUFFOLK ROAD
Town :	MALDON
Region :	ESSEX
Postcode :	CM9 6AX
Email :	simon@utilitysurveysltd.co.uk
Contact Number :	
Surveyor :	Simon Gardiner
Valid Certification No :	L1103

Client Information

Name :	CHURCHILL RETIREMENT LIVING
Contact :	WES SANDERSON
Location :	PARKSIDE
Town :	RINGWOOD
Region :	HAMPSHIRE
Postcode :	BH24 3SG
Tel :	[redacted]
Mobile :	
Email :	
Fax :	

Site Information

Name :	LIDL SITE
Contact :	
Location :	CHRISTYS LANE
Town :	SHAFTSBURY
Region :	DORSET
Postcode :	SP7 8TL
Tel :	
Mobile :	
Email :	
Fax :	

Total Defects for Project

14 | 1 | 33 | 4 | 0

Total DRB Grades for Project

1 | 6 | 1

Report interpretation.

Overview:

Each section of the drainage system is allocated a score indicating areas that require attention. These areas are detailed in the Overview section on the following page and also at the bottom right of the first few pages. We use colour coding as an indicator of severity. Additional information concerning rehabilitation options/recomendations is included in the Overview page, which can also be used as an, "at a glance" indication of system condition. More in depth information for each section, Including images can be found later in the report. Grade indicators are as follows:

Grade A: Drain is serviceable no recommendations required

Grade B: There is an issue that might require remedial works

Grade C: There is a defect that requires remedial works, the drain is not serviceable.

Observations:

Each section of drainage reported on (manhole to manhole for example), contains detailed information about that drain and any observations made concerning condition are detailed below the header section. The observations are colour coded and given a severity score, with more significant defects being given a higher score, using a scale from 1 to 5 as detailed below:

Severity 1 to 2: These defects may require remedial monitoring

Severity 3: These defects probably require some form of remedial works

Severity 4 to 5: Defects that will require remedial repair or replacement

General:

The information provided is relevant at the time of survey. The coding system in this report is based on the Manual of Sewer Condition Classification, 5th edition (MSCC5) domestic codes (BS EN 13508-1:2003). This is the official standard for the water industry.

The severity system is based on significant experience in general practice and the 1 -5 grades represent the severity of individual defects: 5 representing a more serious defect.

Please feel free to contact us for further explanation or pricing for remedial works required.

Total Defects for Project

Total DRB Grades for Project

Overview

Section: 1 **From: F2** **To: F1**	Grade A	**DRB Grade: A** **Pipe Size: 225** **Material: Polyvinyl Chloride** **Use: Foul**
Section: 2 **From: F2** **To: F3**	Grade C	**DRB Grade: C** **Pipe Size: 150** **Material: Vitrified Clay (i.e. all clayware)** **Use: Foul**
Section: 3 **From: S6** **To: MAIN**	Grade B	**DRB Grade: B** **Pipe Size: 100** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 4 **From: F3** **To: F5**	Grade B	**DRB Grade: B** **Pipe Size: 150** **Material: Vitrified Clay (i.e. all clayware)** **Use: Foul**
Section: 5 **From: F5** **To: F6**	Grade B	**DRB Grade: B** **Pipe Size: 150** **Material: Polyethylene** **Use: Foul**
Section: 6 **From: F3** **To: SPUR A**	Grade B	**DRB Grade: B** **Pipe Size: 150** **Material: Polyvinyl Chloride** **Use: Foul**
Section: 7 **From: 8103** **To: 8001**	Grade B	**DRB Grade: B** **Pipe Size: 225** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 8 **From: F4** **To: 8102**	Grade B	**DRB Grade: B** **Pipe Size: 150** **Material: Unidentified material** **Use: Foul**

Total Defects for Project

Total DRB Grades for Project

Site: CHRISTYS LANE, SHAFTSBURY

Section 1

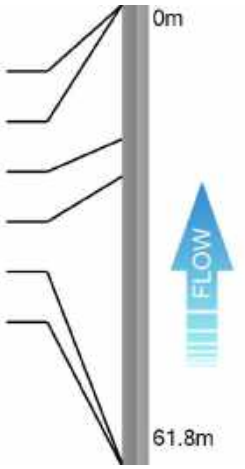
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT LIVING	CHRISTYS LANE	SHAFTSBURY		Simon Gardiner	28/04/2023

Start Node Ref:	F2	Finish Node Ref:	F1	Direction:	U	Height/Dia:	225
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	F	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	PVC	Cleaned	N

Node Type	Cover Condition	Benching Condition	1/2 Channel Condition	Node Condition Remarks
MH				

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	General Remarks
A				D	N	61.8	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
18.00m	WL	Water level 10%			0:02:35
23.00m	WL	Water level 5%			0:03:19
61.50m	REM	General remark		0_4	0:08:17
61.80m	MHF	Finish node type, manhole			



Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

Descriptive Report with Remarks and Observation Images

Section 1

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole F2	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
18.00m	0:02:35	WL	Water level: 10% Height/Diameter	
23.00m	0:03:19	WL	Water level: 5% Height/Diameter	
61.50m	0:08:17	REM	General remark ENTERS MANHOLE	Image Provided - Ref: 0_4 
61.80m		MHF	Finish node type, manhole F1	

Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

Site: CHRISTYS LANE, SHAFTSBURY

Section 2

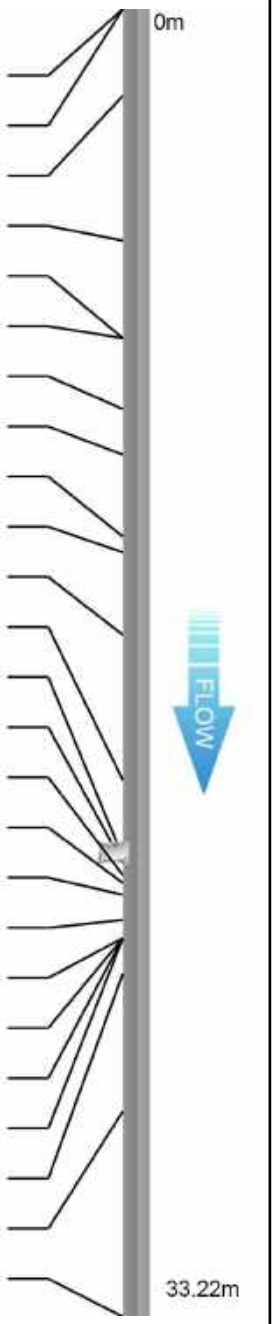
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT LIVING	CHRISTYS LANE	SHAFTSBURY		Simon Gardiner	28/04/2023

Start Node Ref:	F2	Finish Node Ref:	F3	Direction:	D	Height/Dia:	150
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	F	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	N

Node Type	Cover Condition	Benching Condition	1/2 Channel Condition	Node Condition Remarks
MH				

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	General Remarks
A				D	N	73.08	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
02.20m	CC	Crack, circumferential 07-05			0:00:18
05.88m	CCJ	Crack, circumferential 11-03 at joint			0:00:43
08.36m	CL	Crack, longitudinal 03		1_4	0:01:02
08.36m	CCJ	Crack, circumferential 09-03 at joint			0:01:02
10.16m	CLJ	Crack, longitudinal 12 at joint			0:01:19
11.32m	CMJ	Cracks, multiple 07-05 at joint		1_7	0:01:28
13.40m	FL	Fracture longitudinal 11			0:01:55
13.80m	H	Hole in drain/sewer 10-02		1_9	0:02:01
15.90m	RJ	Roots at joint		1_10	0:02:24
19.59m	RJ	Roots at joint			0:02:57
21.54m	CCJ	Crack, circumferential 02-05 at joint		1_12	0:03:17
21.70m	CN	Connection other than junction 02 : 100mm		1_13	0:03:18
22.00m	DES	Settled deposits fine 10%			0:03:23
22.20m	WL	Water level 10%			0:03:32
22.50m	WL	Water level 20%			0:03:32
23.14m	RJ	Roots at joint			0:03:36
23.60m	FL	Fracture longitudinal 03		1_18	0:03:46
23.60m	MC	Material of drain/sewer changes			0:03:48
23.60m	REM	General remark			0:03:48
23.60m	WL	Water level 5%			0:04:16
24.50m	MC	Material of drain/sewer changes			0:04:23
28.00m	RJ	Roots at joint		1_22	0:04:50
33.22m	CLJ	Crack, longitudinal 02 at joint			0:05:42



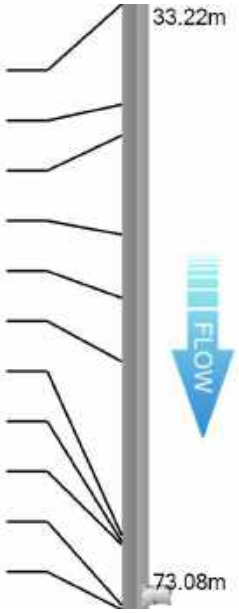
Total Defects for section

9	1	11	4	0

DRB Grade for Section

C

Position	Code	Description	CD	Pic	Video Ref
33.22m	CCJ	Crack, circumferential 07-05 at joint			0:05:42
39.83m	JDL	Joint displaced large		1_26	0:06:46
41.86m	JDL	Joint displaced large		1_27	0:07:05
48.39m	CCJ	Crack, circumferential 03-09 at joint			0:08:19
52.57m	RJ	Roots at joint		1_29	0:09:01
56.75m	RJ	Roots at joint			0:09:41
68.20m	FL	Fracture longitudinal 03		1_31	0:11:35
68.60m	FM	Fracture multiple 07-05		1_32	0:11:40
68.80m	RJ	Roots at joint		1_33	0:11:42
72.79m	JN	Junction 09 : 100mm Diameter		1_34	0:12:40
73.08m	SA	Survey abandoned			



Total Defects for section

9	1	11	4	0

DRB Grade for Section

C

Descriptive Report with Remarks and Observation Images

Section 2

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole F2	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
02.20m	0:00:18	CC	Crack, circumferential from 07 o'clock to 05 o'clock - Severity 1	
05.88m	0:00:43	CCJ	Crack, circumferential from 11 o'clock to 03 o'clock at joint - Severity 1	
08.36m	0:01:02	CL	Crack, longitudinal at 03 o'clock - Severity 1	Image Provided - Ref: 1_4 
08.36m	0:01:02	CCJ	Crack, circumferential from 09 o'clock to 03 o'clock at joint - Severity 1	
10.16m	0:01:19	CLJ	Crack, longitudinal at 12 o'clock at joint - Severity 1	
11.32m	0:01:28	CMJ	Cracks, multiple from 07 o'clock to 05 o'clock at joint - Severity 2	Image Provided - Ref: 1_7 
13.40m	0:01:55	FL	Fracture longitudinal at 11 o'clock - Severity 3	

Total Defects for section

9 | 1 | 11 | 4 | 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
13.80m	0:02:01	H	Hole in drain/sewer from 10 o'clock to 02 o'clock - Severity 4	Image Provided - Ref: 1_9 
15.90m	0:02:24	RJ	Roots at joint - Severity 3 FINE ROOTS AT JOINT	Image Provided - Ref: 1_10 
19.59m	0:02:57	RJ	Roots at joint - Severity 3 FINE ROOTS AT JOINT	
21.54m	0:03:17	CCJ	Crack, circumferential from 02 o'clock to 05 o'clock at joint - Severity 1	Image Provided - Ref: 1_12 

Total Defects for section

9 1 11 4 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
21.70m	0:03:18	CN	Connection other than junction at 02 o'clock: 100mm Diameter	Image Provided - Ref: 1_13 
22.00m	0:03:23	DES	Settled deposits fine: 10% Cross sectional area loss - Severity 3	
22.20m	0:03:32	WL	Water level: 10% Height/Diameter	
22.50m	0:03:32	WL	Water level: 20% Height/Diameter	
23.14m	0:03:36	RJ	Roots at joint - Severity 3 FINE ROOTS AT JOINT	
23.60m	0:03:46	FL	Fracture longitudinal at 03 o'clock - Severity 3	Image Provided - Ref: 1_18 
23.60m	0:03:48	MCPVC	Material of pipe changes to Polyvinyl Chloride	
23.60m	0:03:48	REM	General remark POSSIBLE PVC SLEEVE REPAIR	
23.60m	0:04:16	WL	Water level: 5% Height/Diameter	
24.50m	0:04:23	MCVC	Material of pipe changes to Vitrified Clay (i.e. all clayware)	

Total Defects for section

9 1 11 4 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
28.00m	0:04:50	RJ	Roots at joint - Severity 3 FINE ROOTS AT JOINT	Image Provided - Ref: 1_22 
33.22m	0:05:42	CLJ	Crack, longitudinal at 02 o'clock at joint - Severity 1	
33.22m	0:05:42	CCJ	Crack, circumferential from 07 o'clock to 05 o'clock at joint - Severity 1	
39.83m	0:06:46	JDL	Joint displaced large - Severity 4	Image Provided - Ref: 1_26 
41.86m	0:07:05	JDL	Joint displaced large - Severity 4	Image Provided - Ref: 1_27 
48.39m	0:08:19	CCJ	Crack, circumferential from 03 o'clock to 09 o'clock at joint - Severity 1	

Total Defects for section

9 1 11 4 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
52.57m	0:09:01	RJ	Roots at joint - Severity 3 ROOTS AT JOINT	Image Provided - Ref: 1_29 
56.75m	0:09:41	RJ	Roots at joint - Severity 3 ROOTS AT JOINT	
68.20m	0:11:35	FL	Fracture longitudinal at 03 o'clock - Severity 3	Image Provided - Ref: 1_31 
68.60m	0:11:40	FM	Fracture multiple from 07 o'clock to 05 o'clock - Severity 4	Image Provided - Ref: 1_32 

Total Defects for section

9 | 1 | 11 | 4 | 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
68.80m	0:11:42	RJ	Roots at joint - Severity 3 MASS ROOTS AT JOINT	Image Provided - Ref: 1_33 
72.79m	0:12:40	JN	Junction at 09 o'clock: 100mm Diameter	Image Provided - Ref: 1_34 
73.08m		SA	Survey abandoned UNABLE TO PUSH ROD FURTHER	

Site: CHRISTYS LANE, SHAFTSBURY

Section 3

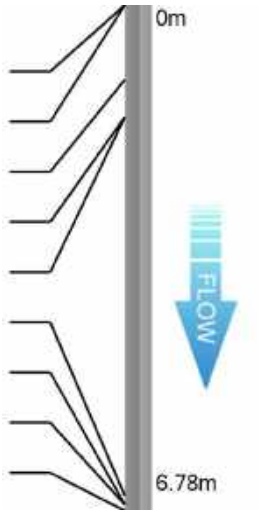
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT LIVING	CHRISTYS LANE	SHAFTSBURY		Simon Gardiner	15/05/2023

Start Node Ref:	S6	Finish Node Ref:	MAIN	Direction:	D	Height/Dia:	100
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	Y

Node Type	Cover Condition	Benching Condition	1/2 Channel Condition	Node Condition Remarks
MH				

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	General Remarks
A				D	N	6.78	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
01.00m	WL	Water level 10%			0:00:16
01.50m	WL	Water level 20%			0:00:16
01.50m	DER	Settled deposits coarse 20%			0:00:26
06.58m	FC	Fracture circumferential 08-04			0:00:00
06.70m	DER	Settled deposits coarse 100%			0:01:13
06.70m	REM	General remark		2_7	0:01:13
06.78m	SA	Survey abandoned			



Total Defects for section

0	0	3	0	0

DRB Grade for Section

B

Descriptive Report with Remarks and Observation Images — Section 3

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole S6	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
01.00m	0:00:16	WL	Water level: 10% Height/Diameter	
01.50m	0:00:16	WL	Water level: 20% Height/Diameter	
01.50m	0:00:26	DER	Settled deposits coarse: 20% Cross sectional area loss - Severity 3	
06.58m	0:00:00	FC	Fracture circumferential from 08 o'clock to 04 o'clock - Severity 3	
06.70m	0:01:13	DER	Settled deposits coarse: 100% Cross sectional area loss - Severity 3	
06.70m	0:01:13	REM	General remark END OF PIPE / COLLAPSE	Image Provided - Ref: 2_7 
06.78m		SA	Survey abandoned DEBRIS / END OF PIPE	

Site: CHRISTYS LANE, SHAFTSBURY

Section 4

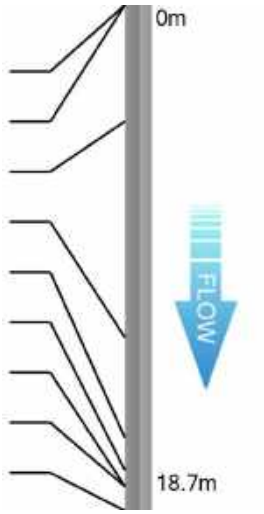
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT LIVING	CHRISTYS LANE	SHAFTSBURY		Simon Gardiner	15/05/2023

Start Node Ref:	F3	Finish Node Ref:	F5	Direction:	D	Height/Dia:	150
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	F	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	N

Node Type	Cover Condition	Benching Condition	1/2 Channel Condition	Node Condition Remarks
MH				

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	General Remarks
A				D	N	18.7	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
04.30m	RJ	Roots at joint			0:00:30
12.29m	CCJ	Crack, circumferential 02-06 at joint			0:01:23
16.00m	CCJ	Crack, circumferential 08-12 at joint			0:01:50
17.20m	CLJ	Crack, longitudinal 11 at joint		3_5	0:01:58
17.80m	CCJ	Crack, circumferential 07-05 at joint		3_6	0:02:02
17.80m	CLJ	Crack, longitudinal 01 at joint			0:02:04
18.70m	MHF	Finish node type, manhole		3_99	



Total Defects for section

5	0	1	0	0

DRB Grade for Section

B

Descriptive Report with Remarks and Observation Images — Section 4

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole F3	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
04.30m	0:00:30	RJ	Roots at joint - Severity 3 TAP ROOTS AT JOINT	
12.29m	0:01:23	CCJ	Crack, circumferential from 02 o'clock to 06 o'clock at joint - Severity 1	
16.00m	0:01:50	CCJ	Crack, circumferential from 08 o'clock to 12 o'clock at joint - Severity 1	
17.20m	0:01:58	CLJ	Crack, longitudinal at 11 o'clock at joint - Severity 1	Image Provided - Ref: 3_5 
17.80m	0:02:02	CCJ	Crack, circumferential from 07 o'clock to 05 o'clock at joint - Severity 1	Image Provided - Ref: 3_6 
17.80m	0:02:04	CLJ	Crack, longitudinal at 01 o'clock at joint - Severity 1	

Total Defects for section

5 | 0 | 1 | 0 | 0

DRB Grade for Section

B

Pos	Video Ref	Code	Description	Image
18.70m		MHF	Finish node type, manhole F5	Image Provided - Ref: 3_9999 

Total Defects for section

5	0	1	0	0

DRB Grade for Section

B

Site: CHRISTYS LANE, SHAFTSBURY

Section 5

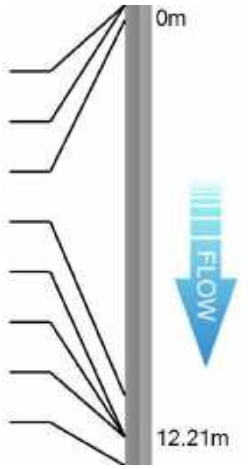
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT LIVING	CHRISTYS LANE	SHAFTSBURY		Simon Gardiner	15/05/2023

Start Node Ref:	F5	Finish Node Ref:	F6	Direction:	D	Height/Dia:	150
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	F	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	PE	Cleaned	N

Node Type	Cover Condition	Benching Condition	1/2 Channel Condition	Node Condition Remarks
MH				

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	General Remarks
A				D	N	12.21	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
00.40m	DEG	S1 Attached deposits, grease 07-05 5%	S1	4_2	0:00:00
10.35m	WL	Water level 10%			0:01:20
11.45m	DEG	F1 Attached deposits, grease 07-05 5%	F1	4_-2	0:00:00
11.45m	MC	Material of drain/sewer changes			0:01:28
11.45m	JN	Junction 06 : 150mm Diameter		4_5	0:01:27
12.21m	MHF	Finish node type, manhole			



Total Defects for section

0 0 2 0 0

DRB Grade for Section

B

Descriptive Report with Remarks and Observation Images — Section 5

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole F5	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
00.40m	0:00:00	S1 DEG	Attached deposits, grease 0.4m - 11.45m from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3	Image Provided - Ref: 4_2 
10.35m	0:01:20	WL	Water level: 10% Height/Diameter	
11.45m	0:00:00	F1 DEG	Attached deposits, grease Defect End from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3	
11.45m	0:01:28	MCVC	Material of pipe changes to Vitrified Clay (i.e. all clayware)	
11.45m	0:01:27	JN	Junction at 06 o'clock: 150mm Diameter BACKDROP AT MANHOLE	Image Provided - Ref: 4_5 
12.21m		MHF	Finish node type, manhole F6	

Site: CHRISTYS LANE, SHAFTSBURY

Section 6

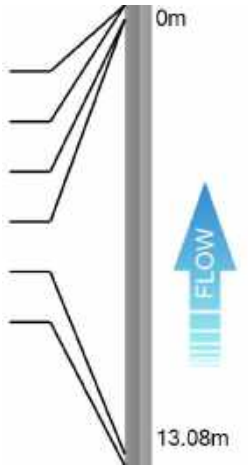
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT LIVING	CHRISTYS LANE	SHAFTSBURY		Simon Gardiner	15/05/2023

Start Node Ref:	F3	Finish Node Ref:	SPUR A	Direction:	U	Height/Dia:	150
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	F	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	PVC	Cleaned	N

Node Type	Cover Condition	Benching Condition	1/2 Channel Condition	Node Condition Remarks
MH				

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	General Remarks
A				D	N	13.08	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
00.40m	LRH	Line of drain/sewer deviates right [half]			0:00:00
00.40m	DEG	S1 Attached deposits, grease 01-11 5%	S1		0:00:18
12.75m	DEG	F1 Attached deposits, grease 01-11 5%	F1		0:00:18
13.08m	MHF	Finish node type, manhole		5_99	



Total Defects for section

0	0	2	0	0

DRB Grade for Section

B

Descriptive Report with Remarks and Observation Images — Section 6

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole F3	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
00.40m	0:00:00	LRH	Line of drain/sewer deviates right [half]	
00.40m	0:00:18	S1 DEG	Attached deposits, grease 0.4m - 12.75m from 01 o'clock to 11 o'clock: 5% Cross sectional area loss - Severity 3	
12.75m	0:00:18	F1 DEG	Attached deposits, grease Defect End from 01 o'clock to 11 o'clock: 5% Cross sectional area loss - Severity 3	
13.08m		MHF	Finish node type, manhole ENTERS MANHOLE F7	Image Provided - Ref: 5_9999 

Site: CHRISTYS LANE, SHAFTSBURY

Section 7

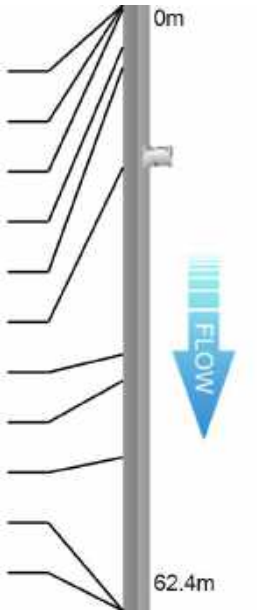
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT LIVING	CHRISTYS LANE	SHAFTSBURY		Simon Gardiner	15/05/2023

Start Node Ref:	8103	Finish Node Ref:	8001	Direction:	D	Height/Dia:	225
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	N

Node Type	Cover Condition	Benching Condition	1/2 Channel Condition	Node Condition Remarks
MH				

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	General Remarks
A				D	N	62.4	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 0%			0:00:00
00.40m	DES	S1 Settled deposits fine 5%	S1		0:00:17
04.30m	RJ	Roots at joint		6_3	0:00:31
06.40m	RJ	Roots at joint		6_4	0:00:45
16.75m	CX	Defective connection 10 : 100mm Diameter		6_5	0:02:11
36.00m	RJ	Roots at joint		6_6	0:04:46
38.70m	RJ	Roots at joint		6_7	0:05:00
46.60m	RJ	Roots at joint		6_8	0:06:04
62.40m	DES	F1 Settled deposits fine 5%	F1		0:00:17
62.40m	SA	Survey abandoned			



Total Defects for section

0 0 8 0 0

DRB Grade for Section

B

Descriptive Report with Remarks and Observation Images — Section 7

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole 8103	
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
00.40m	0:00:17	S1 DES	Settled deposits fine 0.4m - 62.4m: 5% Cross sectional area loss - Severity 3	
04.30m	0:00:31	RJ	Roots at joint - Severity 3 FINE ROOTS AT JOINT	Image Provided - Ref: 6_3 
06.40m	0:00:45	RJ	Roots at joint - Severity 3 TAP ROOTS AT JOINT	Image Provided - Ref: 6_4 
16.75m	0:02:11	CX	Defective connection at 10 o'clock: 100mm Diameter - Severity 3	Image Provided - Ref: 6_5 

Total Defects for section

0 | 0 | 8 | 0 | 0

DRB Grade for Section

B

Pos	Video Ref	Code	Description	Image
36.00m	0:04:46	RJ	Roots at joint - Severity 3 FINE ROOTS	Image Provided - Ref: 6_6 
38.70m	0:05:00	RJ	Roots at joint - Severity 3 FINE ROOTS AT JOINT	Image Provided - Ref: 6_7 
46.60m	0:06:04	RJ	Roots at joint - Severity 3 ROOTS AT JOINT	Image Provided - Ref: 6_8 
62.40m	0:00:17	F1 DES	Settled deposits fine Defect End: 5% Cross sectional area loss - Severity 3	
62.40m		SA	Survey abandoned END OF SURVEY REQUIREMENT / UNABLE TO PUSH CAMERA FURTHER	

Site: CHRISTYS LANE, SHAFTSBURY

Section 8

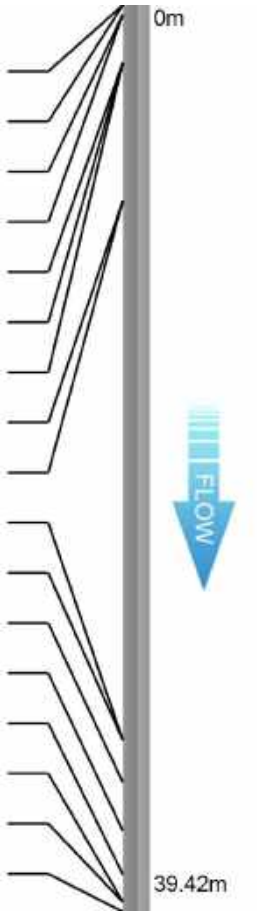
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT LIVING	CHRISTYS LANE	SHAFTSBURY		Simon Gardiner	15/05/2023

Start Node Ref:	F4	Finish Node Ref:	8102	Direction:	D	Height/Dia:	150
Start Node Depth:	0.00	Finish Node Depth:	0.00	Use:	F	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	X	Cleaned	N

Node Type	Cover Condition	Benching Condition	1/2 Channel Condition	Node Condition Remarks
MH				

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	General Remarks
A				D	N	39.42	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 50%			0:00:00
00.40m	CUW	S1 Loss of vision, camera under water	S1		0:00:13
00.40m	REM	S2 General remark	S2	7_6	0:00:46
02.50m	CUW	F1 Loss of vision, camera under water	F1		0:00:13
02.50m	WL	Water level 30%			0:00:12
02.50m	DEE	S3 Attached deposits, encrustation 07-05 20%	S3	7_4	0:00:12
08.50m	DEE	F3 Attached deposits, encrustation 07-05 20%	F3	7_-4	0:00:12
08.50m	DEE	S4 Attached deposits, encrustation 07-05 30%	S4	7_5	0:00:46
31.96m	LLQ	Line of drain/sewer deviates left [quarter]			0:03:50
31.96m	JDM	Joint displaced medium		7_8	0:03:50
33.80m	LRQ	Line of drain/sewer deviates right [quarter]		7_9	0:04:06
35.90m	LRQ	Line of drain/sewer deviates right [quarter]			0:04:31
37.80m	LLQ	Line of drain/sewer deviates left [quarter]			0:04:44
39.00m	DEE	F4 Attached deposits, encrustation 07-05 30%	F4	7_-5	0:00:46
39.00m	DEE	Attached deposits, encrustation 07-05 50%		7_12	0:04:58
39.42m	SA	Survey abandoned			



Total Defects for section

0	0	6	0	0

DRB Grade for Section

B

Descriptive Report with Remarks and Observation Images — Section 8

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole F4	
00.00m	0:00:00	WL	Water level: 50% Height/Diameter	
00.40m	0:00:13	S1 CUW	Loss of vision, camera under water 0.4m - 2.5m	
00.40m	0:00:46	S2 REM	General remark 0.4m - 0m POSSIBLE DEFORMED PITCH FIBRE PIPE	Image Provided - Ref: 7_6 
02.50m	0:00:13	F1 CUW	Loss of vision, camera under water Defect End	
02.50m	0:00:12	WL	Water level: 30% Height/Diameter	
02.50m	0:00:12	S3 DEE	Attached deposits, encrustation 2.5m - 8.5m from 07 o'clock to 05 o'clock: 20% Cross sectional area loss - Severity 3	Image Provided - Ref: 7_4 
08.50m	0:00:12	F3 DEE	Attached deposits, encrustation Defect End from 07 o'clock to 05 o'clock: 20% Cross sectional area loss - Severity 3	

Total Defects for section

0 0 6 0 0

DRB Grade for Section

B

Pos	Video Ref	Code	Description	Image
08.50m	0:00:46	S4 DEE	Attached deposits, encrustation 8.5m - 39m from 07 o'clock to 05 o'clock: 30% Cross sectional area loss - Severity 3	Image Provided - Ref: 7_5 
31.96m	0:03:50	LLQ	Line of drain/sewer deviates left [quarter]	
31.96m	0:03:50	JDM	Joint displaced medium - Severity 3	Image Provided - Ref: 7_8 
33.80m	0:04:06	LRQ	Line of drain/sewer deviates right [quarter]	Image Provided - Ref: 7_9 
35.90m	0:04:31	LRQ	Line of drain/sewer deviates right [quarter]	
37.80m	0:04:44	LLQ	Line of drain/sewer deviates left [quarter]	

Total Defects for section

0 0 6 0 0

DRB Grade for Section

B

Pos	Video Ref	Code	Description	Image
39.00m	0:00:46	F4 DEE	Attached deposits, encrustation Defect End from 07 o'clock to 05 o'clock: 30% Cross sectional area loss - Severity 3	
39.00m	0:04:58	DEE	Attached deposits, encrustation from 07 o'clock to 05 o'clock: 50% Cross sectional area loss - Severity 3	Image Provided - Ref: 7_12 
39.42m		SA	Survey abandoned UNABLE TO PASS ENCRUSTATION	

A guide to defects and other observations in drainage systems

More detailed information can be found in the National Standard (BS EN 13508-1:2003) and in the Manual of Sewer Condition Classification (MSCC) 5th Edition, written by the Water Research Centre (WRc).

Use	
Code	**Description**
C	Combined
F	Foul
S	Surface Water
T	Trade Effulent
W	Culverted Watercourse
Z	Other

Common Materials	
Code	**Description**
VC	Vitrified Clay
PVC	Polyvinyl Chloride
CO	Concrete
CI	Cast Iron
PF	Pitch Fibre
PE	Polyethylene
DI	Ductile Iron

Start Node	Description	Finish Node
MH	Manhole	MHF
IC	Inspection Chamber	ICF
GY	Gulley	GYF
RE	Rodding Eye	REF
SK	Soakaway	SKF
BN	Buchan Trap	BNF
BR	Major Connection without Ref	BRF
CP	Cacth Pit	CPF
OC	Other Special Chamber	OCF
OF	Outfall	OFF
OS	Oil Seperator	OSF
WR	Major Connection without mh	WRF
LH	Lamphole	LHF

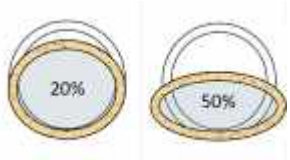
Code	Observation	Description	Attributes	
B	Broken	Pieces pipe have visibly moved	Defined by clock references. Associated with deformity in rigid pipe	
CC CL CM CR	Cracks	Cracks are break lines that are not visibly open	Defined by clock reference position/s. Longitudinal and radiating cracks attract only one clock reference	
CN	Connection	Lateral pipe has been connected after original construction	Described by clock reference position and diameter	

Total Defects for section

0 0 6 0 0

DRB Grade for Section

B

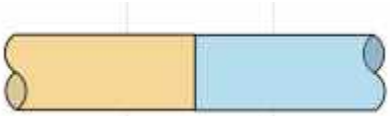
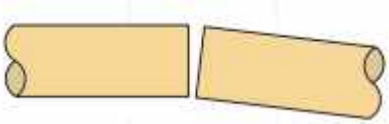
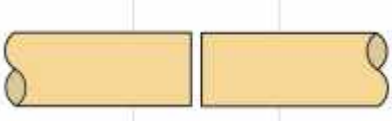
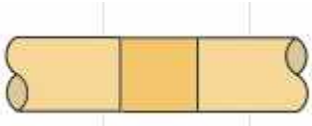
CX(I)	Defective Connection (Intruding)	Defective by intrusion or damage due to factors including: cracks, fractures, obstruction, position etc	Described by clock reference position and diameter (+ % intrusion)	
CU	Loss of Vision	Lens of camera is obscured by debris, water etc. Operator is unable to see drain clearly	'W' can be added if loss of vision is due to wate	
D	Deformed	Pipe has lost its structure	Described by percentage loss of height or width. Recorded in 5% increments	
DEE	Deposits Encrustation	Eg. Attached scale deposits evident	Described by clock referenced position and percentage loss of cross-sectional area (5% increments)	
DEG	Deposits Grease	Attached grease deposits evident	Described by clock referenced position and percentage loss of cross-sectional area (5% increments)	
DER DES	Deposits Coarse/Fine	Settled deposits on the invert of the pipe.	Described by percentage loss of height or diameter. Recorded in 5% increments.	
FC FL FM FR	Fractures	Fractures are visibly open. Pieces of pipe have not moved	Defined by clock reference position/s. Longitudinal and radiating fractures attract only one clock reference	
H	Holes	Section of pipe fabric is missing	Defined by clock reference location. Normally two clock references	
I	Infiltration	Water is infiltrating the pipe, normally via a joint but could be via another defect	Can be described in Remarks using terms such as Seeper, Dripper and Runner	
JDL	Joint Displaced Large	Pipe has moved at joint, perpendicular to axis of pipe	More than 1.5 times the pipe wall thickness must be visible	

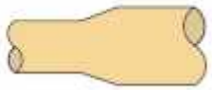
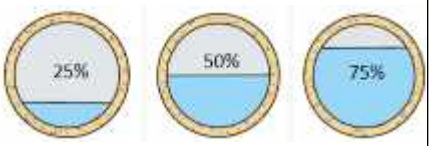
Total Defects for section

0 0 6 0 0

DRB Grade for Section

B

JDM	Joint Displaced Medium	Pipe has moved at joint, perpendicular to axis of pipe	Between 1 and 1.5 times the pipe wall thickness must be visible	
JN	Junction	Lateral pipe was installed at construction	Described by clock reference position and diameter	
JX	Defective Junction	Lateral pipe was installed at construction but is defective in some way	Joint can be defective due to factors including: cracks, fractures, obstruction, position etc	
LD **LU** **LL** **LR**	Line Deviation	LD = Line Down, LU = Line Up, LL = Line Left, LR = Line Right. Not related to CIPP lining.	Additional modifiers are added: Q = Quarter (22.5), H = Half (45), F = Full (90). In degrees.	
LC	Lining Changes	If the drain is lined, the lining material has changed	Position of lining material change	
MC	Material Change	The pipe material has changed	Position of change is noted. Type of material change can be defined	
OB	Obstruction/Obstacle	An obstruction or obstacle is affecting the flow through the pipe	Described in percentage loss of cross-sectional area	
OJL	Open Joint Large	Pipe has moved at joint, along the axis of pipe	More than 1.5 times the pipe wall thickness must be visible	
OJM	Open Joint Medium	Pipe has moved at joint, along the axis of pipe	Between 1 and 1.5 times the pipe wall thickness must be visible	
PC	Pipe Length Changes	Length of individual pipe changes	New length described at this position	

R	Roots	Evidence of root ingress	Roots will normally infiltrate via bad joints, cracks, fractures, breaks etc	
REM	Remark	General remark	Used for additional information	
S	Surface Damage	This might include corrosion, spalling and chemical attack	Position only. Additional information can be added in Remarks	
SA	Survey Abandoned	Used when a survey cannot continue for any reason	The reason for abandoning a survey should be noted in the remarks area	
SC	Shape Changes	Dimension of drain changes	Diameter dimension change recorded. Second dimension is recorded for no circular pipe changes	
SR	Sealing Ring	Sealing ring intrudes into pipe at joint	Described by clock reference position	
V	Vermin	Evidence of Vermin in pipe	Can also be used for evidence within manhole etc	
WL	Water Level	Used to record changes in water level. Always shown at the beginning of every survey, if dry noted as 00.	Described by percentage of height or diameter. Recorded in 5% increments	
XP	Collapsed	Drain is suffering from complete loss of structural integrity. Always followed by SA - Survey Abandoned	Percentage loss of cross-sectional area is recorded. Other related structural defects are not recorded	

REGISTER OF APPENDICES

A. MANHOLE INSPECTION REPORT

B. COPIES OF SITE HAND WRITTEN DAILY RECORD SHEETS

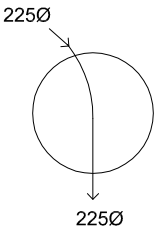
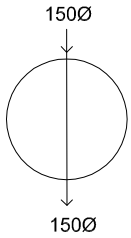
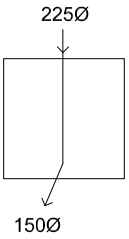
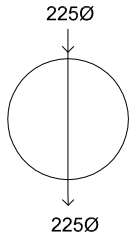
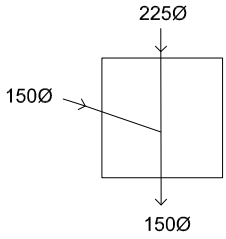
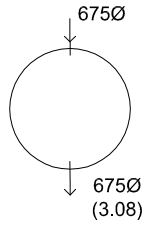
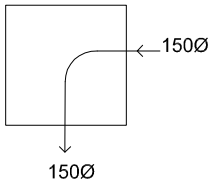
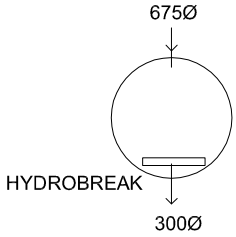
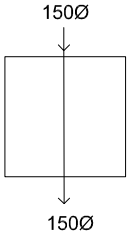
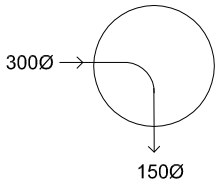
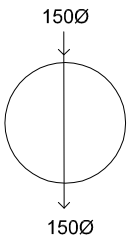
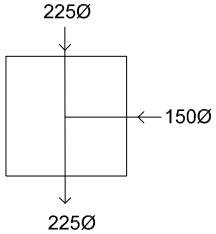
C. ANNOTATED SITE DRAWINGS

UTILITY SURVEYS LTD

5 SUFFOLK ROAD MALDON ESSEX CM9 6AX

LOCATION: LIDL SITE CHRISTYS LANE SHAFTSBURY JOB REF: 071510

CLIENT: CHURCHILL RETIREMENT LIVING DATE: 28/04/2023 and 15/05/2023

MH No. F1 DEPTH. 1.25 COVER. SH CONSTRUCTION. Co Ring REMARKS.		MH No. S1 DEPTH. 0.98 COVER. SH CONSTRUCTION. Co Ring REMARKS.	
MH No. F2 DEPTH. 0.92 COVER. SH CONSTRUCTION. Br REMARKS.		MH No. S2 DEPTH. 2.32 COVER. SH CONSTRUCTION. Co Ring REMARKS.	
MH No. F3 DEPTH. 1.27 COVER. SH CONSTRUCTION. Br REMARKS.		MH No. S3 DEPTH. 3.38 COVER. SH CONSTRUCTION. Co Ring REMARKS.	
MH No. F4 DEPTH. 1.23 COVER. RM CONSTRUCTION. Br REMARKS.		MH No. S4 DEPTH. 1.78 COVER. SH CONSTRUCTION. Co Ring REMARKS.	
MH No. 8102 DEPTH. 1.34 COVER. RM CONSTRUCTION. Br REMARKS.		MH No. S5 DEPTH. 1.00 COVER. SH CONSTRUCTION. Co Ring REMARKS.	
MH No. F5 DEPTH. 1.51 COVER. SH CONSTRUCTION. Co Ring REMARKS.		MH No. 8103 DEPTH. 1.20 COVER. RH CONSTRUCTION. Br REMARKS.	

KEY:

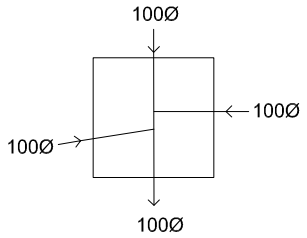
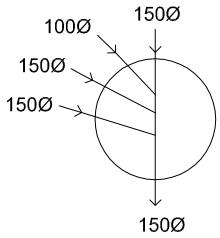
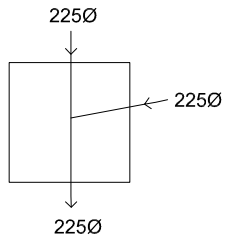
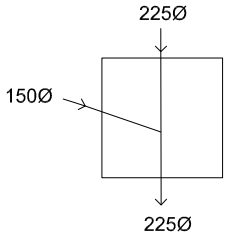
C - Circular	L - Light Duty	Co - Concrete
S - Square	M - Medium Duty	Br - Brick
T - Triangular	H - Heavy Duty	R - Rectangular

UTILITY SURVEYS LTD

5 SUFFOLK ROAD MALDON ESSEX CM9 6AX

LOCATION: LIDL SITE CHRISTYS LANE SHAFTSBURY JOB REF: 071510

CLIENT: CHURCHILL RETIREMENT LIVING DATE: 28/04/2023 and 15/05/2023

MH No. F6 DEPTH. COVER. CONSTRUCTION. REMARKS.	BURIED IN DENSE VEGETATION	MH No. S6 DEPTH. 0.70 COVER. RM CONSTRUCTION. Co REMARKS.	
MH No. F7 DEPTH. 1.41 COVER. SH CONSTRUCTION. Co Ring REMARKS.		MH No. HW1 DEPTH. 0.94 COVER. RM CONSTRUCTION. Br REMARKS.	
MH No. 9001 DEPTH. 1.48 COVER. SH CONSTRUCTION. Br REMARKS.			

KEY:

C - Circular	L - Light Duty	Co - Concrete
S - Square	M - Medium Duty	Br - Brick
T - Triangular	H - Heavy Duty	R - Rectangular

MH F2 UPSTREAM, NOT BENCHED

2 x PITS on NORTH EAST BOUNDARY 1.92m DEEP

MH S6 LOCATION

MH S6

MH F3 COVER

MH F3

MN F7 IN TESCO’S

MH F7

MH 9001 IN ROUNDABOUT

CCTV Sewer Survey – Daily Record Sheet

Date	28/04/2023	Job No	071510
Client	CHURCHILL RETIREMENT LIVING		
Site Address	LIDL SITE		
	CHRISTYS LANE		
	SHAFTSBURY SP7 8TL		
Rig Manager	S. GARDINER	Operative	M. CAMPBELL

UTILITY SURVEYS LTD.
5 Suffolk Road
Maldon
Essex
CM9 6AX
Tel: 07971910370

Manhole Start	Manhole Finish	Sewer dia.	Recorded Metreage	Survey Abandoned	Remarks
F2	F1	225	61.80		
F2	F3	150	73.08	/	UNABLE TO PUSH FURTHER
		TOTAL			

Standing Time | Meterage check: X | Length: OK

Reason for standing time

Remarks: F3 NOT FOUND OR REACHED OVER TESCO LAND.

[redacted]

CCTV Sewer Survey – Daily Record Sheet

Date	15/05/2023	Job No	07510-02
Client	CHURCHILL RETIREMENT LIVING		
Site Address	LIDL SITE		
	CHRISTYS LANE		
	SHAFTESBURY DORSET		
Rig Manager	S. GARDINER	Operative	M. CAMPBELL

UTILITY SURVEYS LTD.
5 Suffolk Road
Maldon
Essex
CM9 6AX
Tel: 07971910370

Manhole Start	Manhole Finish	Sewer dia.	Recorded Metreage	Survey Abandoned	Remarks
S6	MAIN	100	6-78		DEBRIS/END OF PIPE
F3	F5	150	18-70		
F5	F6	150	12-21		
F3	SURA	150	13-08		MHOLE
S103	S001	225	62-46		
FA	S102	150	29-42	✓	ENCRUSTATION
		TOTAL			

Standing Time | Meterage check: X | Length: OK

Reason for standing time

Remarks

S6 - MAIN UNABLE TO CLEAR (END OF PIPE/COLLAPSE)
S103 - S001 NO CONNECTION FROM MH S6
FA - S102 POSSIBLE DEFORMED PITCH FIBRE
S102 - FA 40% ENCRUSTATION

[redacted]

FA

S3

S2 AUDIBLE TRACE
TO S3 & S4

ASSUMED ROUTE

S2

S1

S4

S5

S102

S103

F2

2x PITS
1-92MDEEP

To F3
NOT REACHED
OR FOUND

Barton Hill House

ESS

219.8m

Longmead Industrial Estate

Mast

El Sub Sta

HW1

0-94

10M

Cycleway

0-95

20M

0-95

27M

1-40M

37M

1-40M

42M

1-40M

45M

1-38M

56M

1-36M

45M 1-35M

40M 1-35M

30M 1-35M

20M 1-40M

10M 1-25M

Cycleway

S102

S103

FA

10M 1.30M

20M 1-40M

30M 1-45M

40M 1.38M

HEAVY ENCRUSTATION

F1

225ø

61.8M

F2

150ø

15M

To S001

Filling Station

150ø

F7

13.08M

F3

18.70M

150ø

F5

12.21M

150ø F6

150ø

225ø

S001

225ø

UTF BURIED DENSE VEG

Hardy Lodge

Car

(Recn Gd)

Football Ground

Appendix E Wessex Water Sewer Records and correspondence

Response to: clare.duncan@nrswa.net (Developer Response)			
Planning Ref:	N/A	**Email:**	Planning.liaison@wessexwater.co.uk
Proposal:	Foul and SW capacity check for 38 retirement apartments	**Our Ref:**	ST82SE/ 73
Location:	Land at Christy's Lane, Shaftesbury, SP7 8TL	**Date:**	26 April 2023

Existing Services

There are no known Wessex Water assets within the proposed site boundary.

The 150mm diameter foul sewer you refer to in your email and as shown on the Lidl Food store, Site Layout, Site Drainage drawing, drawing ref 3021, Rev As Built 2, dated June 2020, submitted with your enquiry, is not recorded on our system. Further to this, we would advise that none of on-site foul and surface water sewers serving the Lidl store and shown on this drawing are recorded on our systems, we have no record of any of the services being offered for adoption and would, therefore, assume they have remained in private ownership.

You will need to negotiate with the private owner with regards to diversion or connection to this foul sewer. Please be aware that if subsequently you wish to offer the on-site services for your development for adoption, and the existing foul sewer serving Lidl Store remains within the site boundary, it will be your responsibility to ensure that it meets adoptable standards. Further to this, if you should wish to offer for adoptions, we would require a 3m standoff either side of the 150mm diameter foul with no building within the standoff and no tree planting within 6m.

With reference to your question regarding the soakaway pits shown on the Lidl Proposed Site Plan Overlay Rev B and visible within the photographs you have provided. Again, we have no record of these and therefore, assume they remain in private ownership.

A map showing all known Wessex Water Assets within the area of the proposed site is attached at the bottom of this response. Additional maps can be obtained from our website Mapping enquiries (wessexwater.co.uk)

Foul Drainage

Wessex Water will accommodate domestic type foul flows in the public foul sewer with connections made on a size for size basis, Developers fund the cost of connecting to the nearest 'size for size' sewer. The minimum diameter receiving sewer to meet size for size principles for a development of this magnitude is 150mm.

Capacity is available to accommodate the foul flows from the proposed development, the nearest public foul sewer of suitable diameter or greater is the 225mm diameter located on Christy's Lane.

The point of connection to the public network is by application and agreement with Wessex Water.

Please Note: No surface water runoff, land drainage or ground water will be accepted into the foul sewer either directly or indirectly.

Surface Water Drainage (rainwater falling onto, and running off, impermeable surfaces)

Surface water runoff will need to be managed in accordance with the SuDs hierarchy and NPPF. Wessex Water will be looking for a full suite of SuDS components to be considered and included in the proposals for the capture, storage and discharge of surface water runoff. Discharge rates and volumes will need to be agreed and approved by the LLFA.

National planning policy requires SuDS to provide multifunctional benefits, where possible. There are four main categories of benefits that can be achieved by SuDS: water quantity, water quality, amenity and biodiversity. These are referred to as the four pillars of SuDS design.

If you are able to demonstrate, beyond reasonable doubt, that all other options within the SuDS Hierarchy are not viable, we will consider a connection to the 225mm diameter public surface water sewer located on Christy's Lane approximately 92m southeast of the site. Discharge rates and volumes will need to be agreed, please note this will be at a minimum 30% betterment over greenfield runoff rate.

Please Note: No surface water runoff, land drainage or ground water will be accepted into the foul sewer either directly or indirectly.

Water Infrastructure

Wessex Water will provide a point of connection for new water mains to be laid into the development site, either through a Section 41 agreement or a self-lay arrangement.

Developers may connect to our water network on a size for size basis at their cost and Wessex Water will undertake any network reinforcement that may be required to accommodate granted development, this is funded through our infrastructure charging arrangements. Upon grant of planning Wessex Water will undertake a modelling exercise to determine the impact on our network and manage any necessary improvements.

The nearest supply main of appropriate diameter is the 125mm approximately 45m southeast of the site.

Please Note: On site private storage and pump systems will be required for buildings greater than 2 storeys high. No guarantee can be given on a specific pressure or to maintaining that pressure. Normally it will be no less than 10m head of water. (1 bar pressure at 9 litres a minute) on the property boundary.

For more details and guidance for applying to connect to our networks please see our website: https://www.wessexwater.co.uk/services/building-and-developing/building-multiple-properties-or-large-developments

New Appointments and Variations (NAVs)

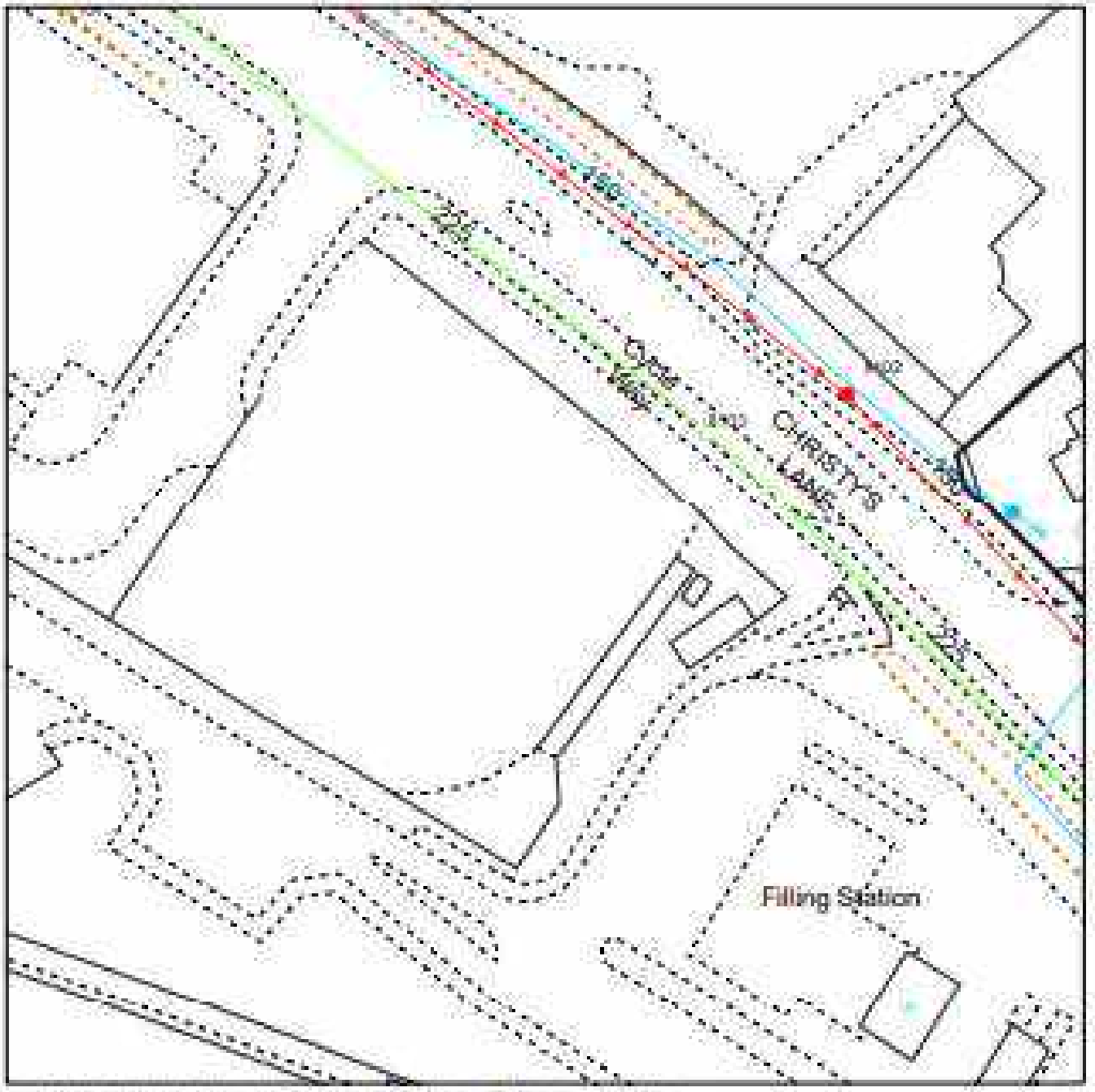
The NAV Market enables developers to choose their water and sewerage undertaker for a specific geographic area.

For developers wishing to consider an alternative supplier or seeking further information, a full list of appointees and further guidance can be found on the Wessex Water and Ofwat website.

Invert and Sewer Levels

Details of invert and sewer levels can be obtained from our Asset Mapping Team, they can be contacted on asset.enquiries@wessexwater.co.uk

ST82SE/ 73 ASSET MAP



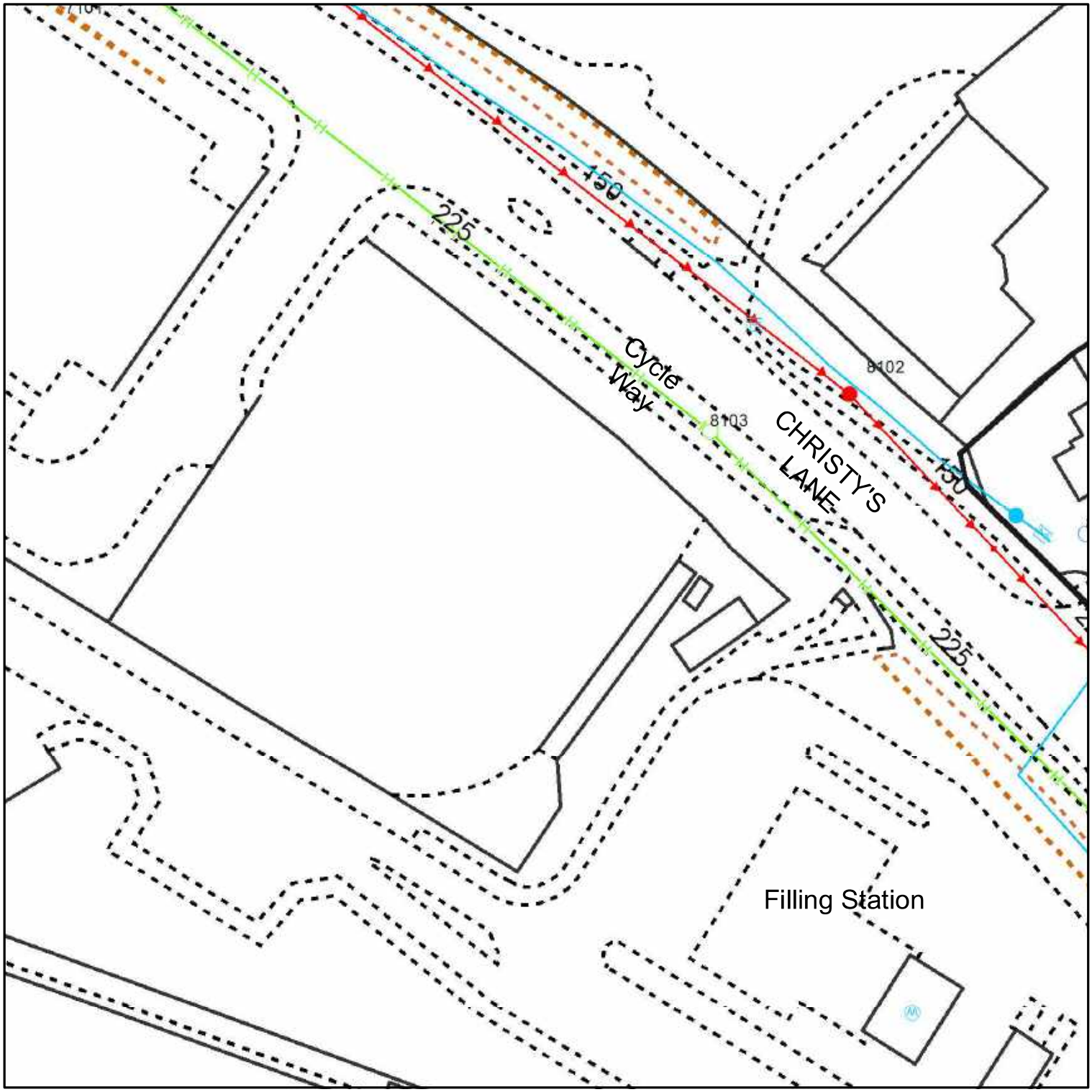
Wessex Water

Date: 26/04/2023, 10:46:59

Scale: 1:625

Centre: 368,808, 153,113

ST82SE/ 73 ASSET MAP



WATER MAINS
- Distribution Main
- Washout Main
- Raw Water Main
- Abandoned Main
- Private Main

SITES
- Source
- Reservoir
- Pump
- Treatment Works

FITTINGS
- Valve - Open
- Valve - Closed
- Fire Hydrant
- Pressure Reducing Valve
- Meter

SEWERS — PUBLIC / PRIVATE / SECTION 104
- Foul
- Surface
- Combined
- Abandoned

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- EDM — Effluent Disposal
- Overflow
- S — Syphon

NON-WESSEX / UNKNOWN
- Private Rising Mains
- CW — Culverted Watercourse
- H — Highway Drain
- ? — Use Unknown
- SU — Status Unknown

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow) styles of line are shown on the key in sample/typical colours.

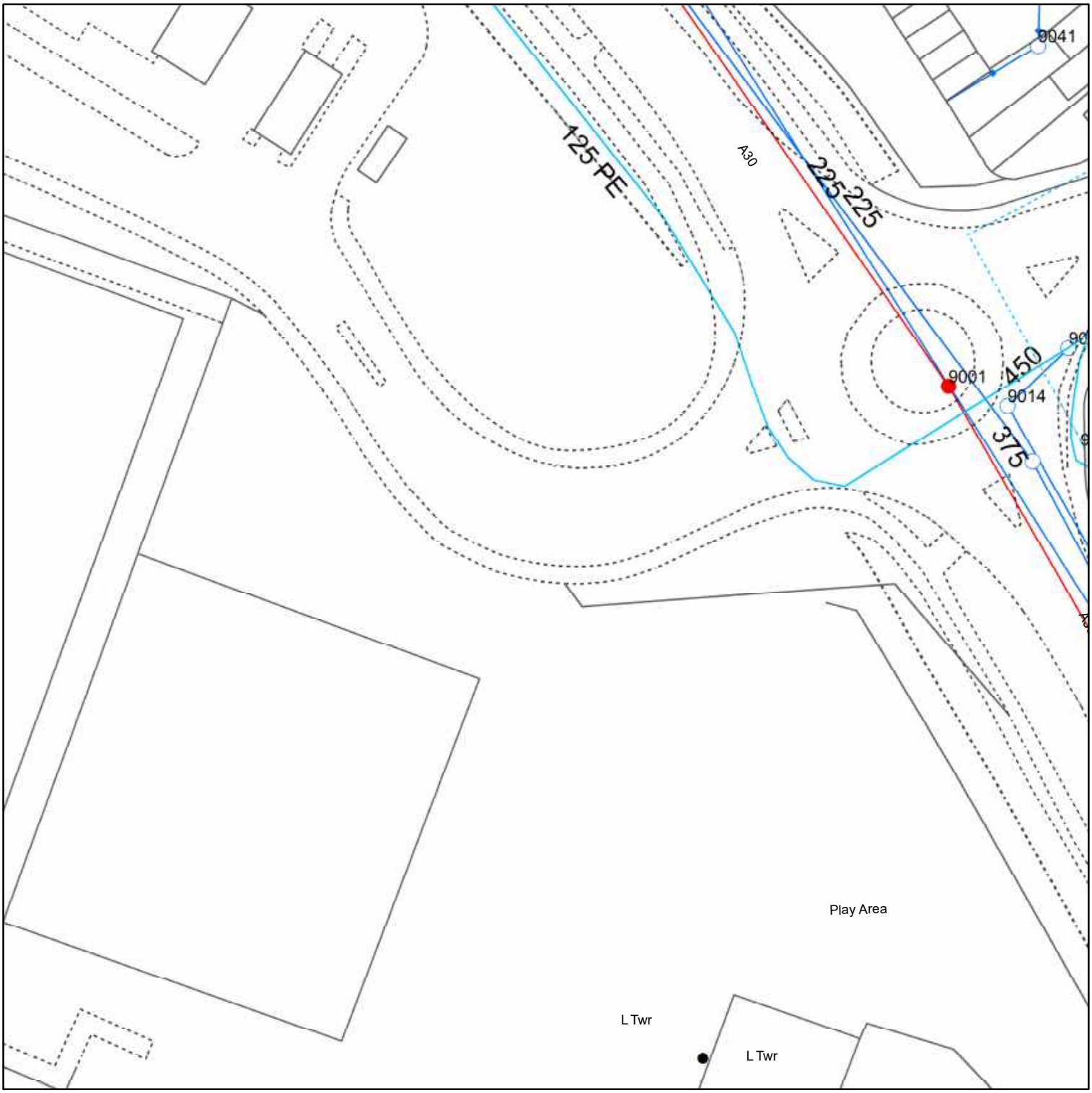
STRUCTURES
- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Outfall
- Inlet
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Washout
- Air Valve
- Hatch Box

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

Wessex Water
YTL GROUP

Date: 26/04/2023, 10:46:59
Scale: 1:625
Centre: 386,804, 123,112

Wessex Water Network Map



WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
- Foul
- Surface
- Combined
- Abandoned

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow). Some styles of line and symbol are shown on the key in sample/typical colours.

STRUCTURES
- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Inlet
- Outfall
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- X Washout

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- EDM Effluent Disposal
- Overflow
- S Syphon

NON-WESSEX / UNKNOWN
- Private Rising Mains
- CW Culverted Watercourse
- H Highway Drain
- ? Use Unknown
- SU Status Unknown

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

Wessex Water
YTL GROUP

Date: 09/05/2023
Centre: 386885, 122999
Scale: 1:625
(when printed at A4 size)

N W E S

Appendix F Greenfield Runoff Calculation

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Ben Green
Site name:	Land at Christy's Lane, Shaftesbury
Site location:	Shaftesbury

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.

Site Details

Latitude:	51.00723° N
Longitude:	2.18932° W
Reference:	3033308586
Date:	Jul 20 2023 15:40

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha): 1

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.636
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm):	870	870
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):		3.5
1 in 1 year (l/s):		2.97
1 in 30 years (l/s):		8.04
1 in 100 year (l/s):		11.15
1 in 200 years (l/s):		13.07

Net Dev. 0.252 ha

QBAR = 0.88 l/s

Q2 = 0.77 l/s

Q30 = 2.03 l/s

Q100 = 2.81 l/s

Appendix G Proposed Site Plan

REVISIONS

Rev. Date By

NORTH

1 BED APARTMENTS = 27
2 BED APARTMENTS = 14

TOTAL = 41

- 1 BED APARTMENTS
- 2 BED APARTMENTS
- COMMUNAL AREAS

0 5 10 15 20

scale bar - metres

planning issues
TOWN PLANNING AND ARCHITECTURAL DESIGN

Rob Jackson RIBA

Churchill House * Parkside
Ringwood * Hampshire BH24 3SG
Telephone: (01425) 462109
Fax : (01425) 462101
E-mail design@planningissues.co.uk

Client

Churchill Retirement Living

Project Title

Retirement Living Apartments
Christys Lane
Shaftesbury

Drawing Title

PROPOSED SITE PLAN

Scale 1:200 @ A1 Date AUG 23
Drawn MJS Checked RJ
Drawing No. Rev.

10127SB-PA01

Appendix H Causeway Flow Model outputs

Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	45	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
Soakaway	0.147	4.00	100.000	1200	2.000

Simulation Settings

Rainfall Methodology	FEH-13	Skip Steady State	x	Check Discharge Volume	✓
Summer CV	0.750	Drain Down Time (mins)	2000	100 year 360 minute (m³)	
Winter CV	0.840	Additional Storage (m³/ha)	20.0		
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	45	0	0
30	45	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	FEH	Growth Factor 100 year	2.48
Positively Drained Area (ha)	0.252	Betterment (%)	0
SAAR (mm)	869	QMed	
Host	1	QBar	
BFIHost	0.636	Q 1 year (l/s)	
Region	7	Q 30 year (l/s)	
QBar/QMed conversion factor	1.136	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)	0.252	Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI	124.673	Runoff Volume (m³)	

Node Soakaway Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.10800	Invert Level (m)	98.000	Depth (m)	
Side Inf Coefficient (m/hr)	0.10800	Time to half empty (mins)	1031	Inf Depth (m)	
Safety Factor	3.0	Pit Width (m)	10.000	Number Required	1
Porosity	0.95	Pit Length (m)	12.500		

Results for 2 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	Soakaway	280	98.235	0.235	5.7	28.5704	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
360 minute winter	Soakaway	Infiltration	1.4

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	Soakaway	344	98.583	0.583	11.3	70.6955	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
360 minute winter	Soakaway	Infiltration	1.5

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	Soakaway	456	98.795	0.795	11.6	96.4442	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
480 minute winter	Soakaway	Infiltration	1.6

Appendix I Preliminary Drainage Layout (PDL) Drawing

Key

- Site Boundary
- RPA — Root Protection Area
- TPXX / XXXX — Trial Pit

Existing Utilities

- Existing Adopted Foul Water Sewer
- Existing Adopted Highway Sewer
- Existing Private Foul Water Sewer
- Existing Private Foul Water Sewer to be Abandoned
- Existing Private Surface Water Sewer
- Existing Water Main

Proposed Private Drainage

- Building Catchment
- Impermeable Catchment
- Surface Water Sewer
- Surface Water Inspection Chamber
- Gully and Connection
- Cellular Soakaway
- Foul Water Sewer
- Foul Water Inspection Chamber
- Foul Water Sewer Diversion
- Foul Water Diversion Inspection Chamber
- Overland Flood Flow Route

Christy's Lane

Existing private foul sewer, which serves the Lidl Superstore, to be diverted.

Foul Water Strategy:

Foul flows generated by the site to connect to the proposed diverted private foul sewer network via on-site connections.
Private foul connection continues South East and ties in with Wessex Water foul sewer.
Existing point of connection at manhole 9001.

Surface Water Strategy:

1. Cellular Soakaway

Runoff generated by proposed development to be intercepted and drained to a new cellular soakaway, designed to accommodate the 1 in 100 year return period storm, with allowance for climate change and Factor of Safety of 3, in line with CIRIA C753.
The soakaway design has been informed by the test results from TP2 and will include silt traps within all chambers immediately upstream of the soakaway.

2. Maintenance

It is recommended that the cellular soakaway is fitted with access turrets (or similar) to facilitate future inspection and maintenance.

TP2
3 x 10^{-5} m/s

TP1
2 x 10^{-5} m/s

Exceedance Flows

Beyond the capacity of the proposed surface water network and attenuation, exceedance flows would be directed away from the proposed building and towards areas of landscaping, and/or car parking, wherever possible. Beyond the capacity of the site, flows would continue off site as per existing conditions.

Notes

1. The proposed development has been assessed in line with the National Planning Policy Framework, to allow the planning application to be progressed and to show that the development can be undertaken in an acceptable manner from a flood risk perspective.
2. The proposed site is located within Flood Zone 1 and are not known to be susceptible to flooding from pluvial, groundwater, infrastructure, or artificial sources.
3. To ensure the development is safe from flooding throughout its lifetime, the surface water strategy accounts for runoff in up to the 1 in 100-year return period.
4. The strategy also safeguards against climate change (45%), providing betterment over existing conditions, where the rate and volume of runoff would continue to increase due to climate change.
5. Infiltration is considered a suitable method of surface water disposal. The use of soakaways are therefore prioritised in line with the drainage hierarchy.
6. The proposed surface water management plan will reduce the peak rates and volumes of runoff compared to baseline conditions and will also offer a significantly reduced pollution hazard compared to the sites previous use as a cattle market.
7. Beyond the 100-year critical storm, exceedance runoff will be directed away from the proposed building and towards any residual areas of open space and/or car parking, where any aboveground storage can be used.
8. The existing on-site private foul sewer will be diverted to accommodate the development. Foul flows generated by the proposed development will be served by a new private gravity network and will tie into the diverted foul sewer, which continues downstream to Wessex Water's adopted foul network within Christy's Lane.
9. All on-site proposed drainage will remain private and will be designed in accordance with Building Regulations Part H and CIRIA C753 and will become the responsibility of the building operator.
10. As the development will be safe from flooding throughout its lifetime and will actively reduce the flood risk to properties within the downstream catchment, it is recommended that the Local Planning Authority confirm they have no objections to the proposed development.

Area Summary Schedule

Gross Site Area	0.252 ha
Impermeable Catchment	0.147 ha

Equivalent Greenfield Runoff

The greenfield runoff rates have been assessed for the site using the FEH method.

Return Period	Greenfield Rate (l/s)
2yr	0.8
30yr	2.0
100yr	2.8

Attenuation Summary

Attenuation will be provided by a cellular soakaway.

Cellular Soakaway

Ownership:	Private
Catchment Area:	0.147ha
Area:	127m^2
Depth:	2mBGL (0.8m deep with 1.2m cover)
Porosity:	95%
Factor of Safety:	3
Infiltration Rate:	3 x 10^{-5} m/s
Total 100yr+45% CC Volume required:	**96.4m^3**

REV	DATE	DESCRIPTION	BY	CHK	APD
B	17.08.2023	UPDATED TO SUIT LATEST LAYOUT	BJG	LB	CPY
A	11.08.2023	INITIAL ISSUE	BJG	LB	CPY

CLIENT: PLANNING ISSUES LTD

DRAWING STATUS: PLANNING APPLICATION

PROJECT: LAND AT CHRISTY'S LANE, SHAFTESBURY

TITLE: PRELIMINARY DRAINAGE LAYOUT

PROJECT No:	DRAWING No:	REV:
1552	01-PDL-1001	B

SCALE @ A2: 0 1:250 12.5 metres

DESIGN BY:

awcockward partnership
Awcock Ward Partnership, Ada House, Pynes Hill, Exeter, EX2 5TU
Tel: 01392 409007 Web: www.awpexeter.com

Appendix J Projected foul sewage flows and sewer capacity

Projected Foul Sewage Flows

Project No.	1552
Project Title	Land at Christy's Lane, Shaftesbury
Client	Planning Issues Ltd

Calcs by	LB
Reviewed by	CY
Date	26/07/2023

Title	Type of Unit	Unit Value	Average Flow (l / day)	Total Flow	Total Flow	Peak Flow Multiplier	Infiltration	Peak Flow	Comments
Proposed Retirement Apartments	Residential old people / nursing home	53 persons	350 per person	18550 litres / day	0.215 litres / sec	6	Standard (10%)	1.417 litres / sec	Based on the avergae occupation rates for similar properties.
Lidl Supermarket	Commercial Premises	2000 m2	300 per 100m2	6000 litres / day	0.069 litres / sec	8	Standard (10%)	0.611 litres / sec	Total building footprint including warehouse section.
Tesco Filling Station	Full-time day staff	3 persons	90 per person	270 litres / day	0.003 litres / sec	8	Standard (10%)	0.028 litres / sec	
Tesco Car Wash						1	Standard (10%)	1.030 litres / sec	Auto Car Wash and Lance Bay estimated combined flows.
				24820 litres / day	0.287 litres / sec			3.086 litres / sec	
			Population equivalence	165 people/day					

Colebrook-White Pipe Capacity Analysis

Project No.	1552
Project Title	Land at Christy's Lane, Shaftesbury
Client	Planning Issues Ltd
Sheet Ref	P:\1552 Land at Christy's Lane, Shaftesbury\D Design and Analysis\SPREADSHEETS\01 Drainage\03 Sewer Design\[Colebrook White Equation (pipe velocity & capacity).xlsx]Colebrook-White

Calcs by	L Blackmore
Checked by	C Yalden
Approved by	C Yalden
Date	26/07/2023
Revision	Inititial

Pipe capacity calculation based on the Colebrook White Equation (HR Wallingford, 1990);

$$V = -2\sqrt{(2gDS)}\log_{10}\left(\frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{(2gDS)}}\right)$$

Fluid type: **Foul**

Where:

D	*Pipe diameter*		**150**	mm
S	*Hydraulic gradient*	1 in	**150**	m/m
k_s	Effective pipe roughness		**1.5**	mm
g	*Gravitiational acceleration*		**9.81**	m/s^2
ν	*kinematic viscosity*		**1.01E-06**	m^2/s
A	*Cross-sectional flow area*		**0.018**	m^2
Q	*Discharge*		**12.620**	l/s
V	Velocity		**0.71**	m/s

Catchment area analysis based on Modified Rational Method equation (HR Wallingford, 1990);

$$Q_{BAR} = 2.78 \cdot i \cdot A$$

Hydrological Region: *see map

Where:

Q_{BAR}	*Average discharge (l/s)*				
i	*Rainfall intensity (mm/hr)*	i		mm/hr	*see map
A	*Catchment area (m^2)*				

Return Period	2yr	30yr	100yr	
Growth Factor (Q/QBAR)	2yr	30yr	Hundred	
Critical Area (ha)	######	#VALUE!	#VALUE!	(area that can freely drain)

Brownfield flow rate analysis based on Modified Rational Method (HR Wallingford, 1990);

	2yr	30yr	100yr	QBAR
Area (ha):	BF flow (l/s):	#########	#VALUE!	#VALUE!	0.00

Foul capacity analysis for dwellings based on Sewers for Adoption (6th Edition);

l/dwelling/day	0.046
No. dwellings served	273
No. dwellings served +10% infiltration	248