Ada House
Pynes Hill
Exeter
EX2 5TU
Tel: 01392 409007
www.awpexeter.com

Technical Note

Castle Street, Banbury

Flood Risk & Drainage Technical Note

Project No.	1260
Revision	B
Date	7th December 2021
Client	Churchill Retirement Living
Prepared	L Blackmore
Checked	A Hanks
Authorised	C Yalden
File Ref.	**P:\1260 Castle Street, Banbury\C Documents\Reports\1260 - Castle Street, Banbury - Flood Risk & Drainage Technical Note**

1 Introduction

Introduction & Background

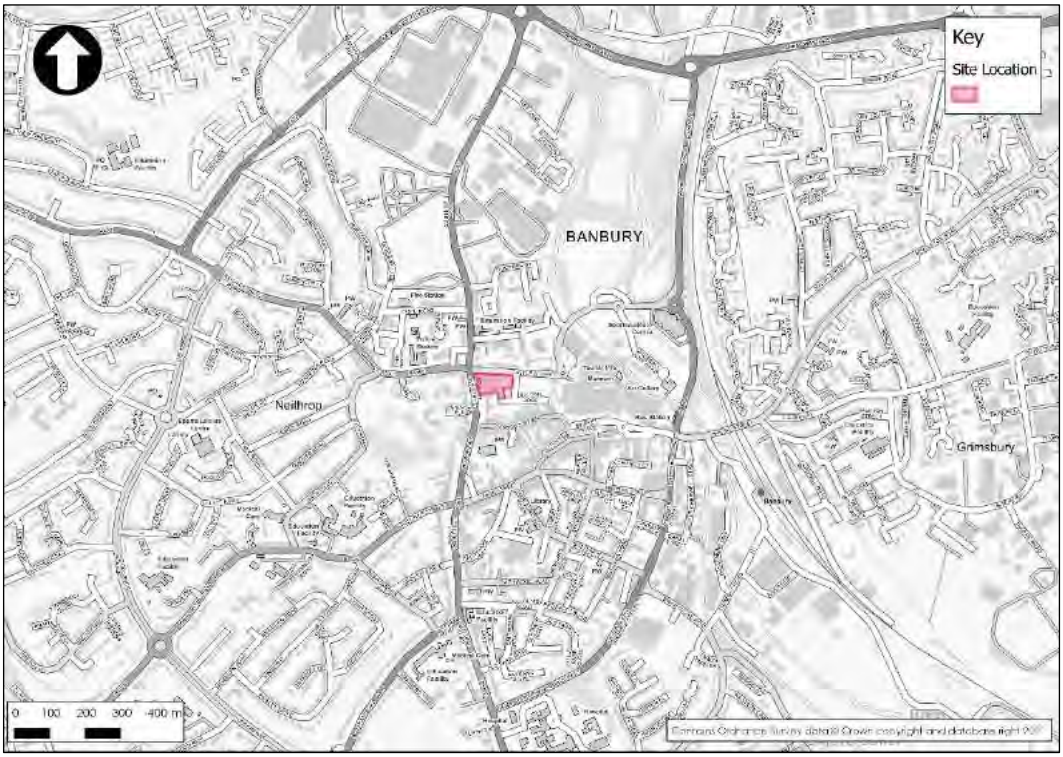
1.1 Awcock Ward Partnership has been commissioned by Churchill Retirement Living (CRL) to prepare a Flood Risk and Drainage Technical Note in support of a full planning application for the redevelopment of the former Buzz Bingo site, Bolton Road, Banbury, Oxfordshire, OX16 0TH.

1.2 The redevelopment is proposed to provide 80 new retirement apartments.

1.3 The existing site is bound to the north by Castle Street and on the west by North Bar Street (A361). The east and south are bound by Bolton Road. The surrounding area generally consists of both commercial and residential developed land.

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

Figure 1.1 – Site Location



1.5 This Technical Note has been prepared broadly in accordance with the National Planning Policy Framework (NPPF) and Oxfordshire County Council (OCC) 'Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire' (OCC SWDG, 2018) which provides a guide on surface water management for developments in Oxfordshire. The existing baseline conditions, development proposals and the proposed Surface Water Management Plan and foul water strategy that will serve the development is set out below.

1.6 This document sets out the existing baseline conditions in Section 2, 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 brownfield site comprises of an existing large building and associated car park, with access from Bolton Road to the south of the site. The topographic survey confirms the site generally falls at a shallow grade of approximately 1 in 35 from south to north and is relatively flat across the car park area. The site has a high point of 98.36mAOD adjacent to the southern

boundary, next to the building. The site slopes down to the northwest corner to a low point of 95.01mAOD adjacent to the footway on Castle Street. A copy of the topographic survey for the site can be seen as Appendix A.

Existing Flood Risk

2.2 An extract of the 'Flood Map for Planning' has been reproduced as Figure 2.1 and shows the site as being entirely within 'Flood Zone 1', as land assessed as having less than 1 in 1,000 annual probability of flooding from fluvial sources (<0.1%).

Figure 2.1 – EA Flood Map for Planning

Pluvial sources (surface water flooding)

2.3 An extract of the EA's 'Flooding from Surface Water' maps for low and medium risk from surface water flooding are shown in Figures 2.2 and 2.3. The mapping is based on LIDAR data and indicates the typical conveyance routes of surface water runoff. Figure 2.2 indicates the low risk surface water flooding, in up to the 1 in 1,000 year return period storm (annual probability <0.1%), whilst Figure 2.3 shows the medium risk flooding, in up to 1 in 100 year return period storm (1%).

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

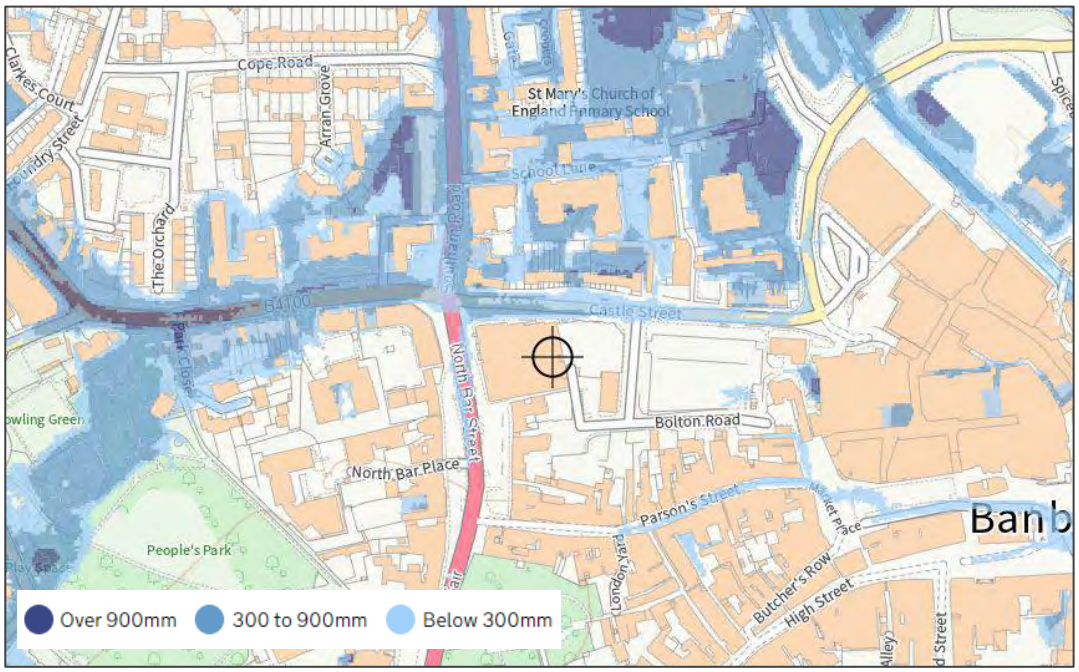
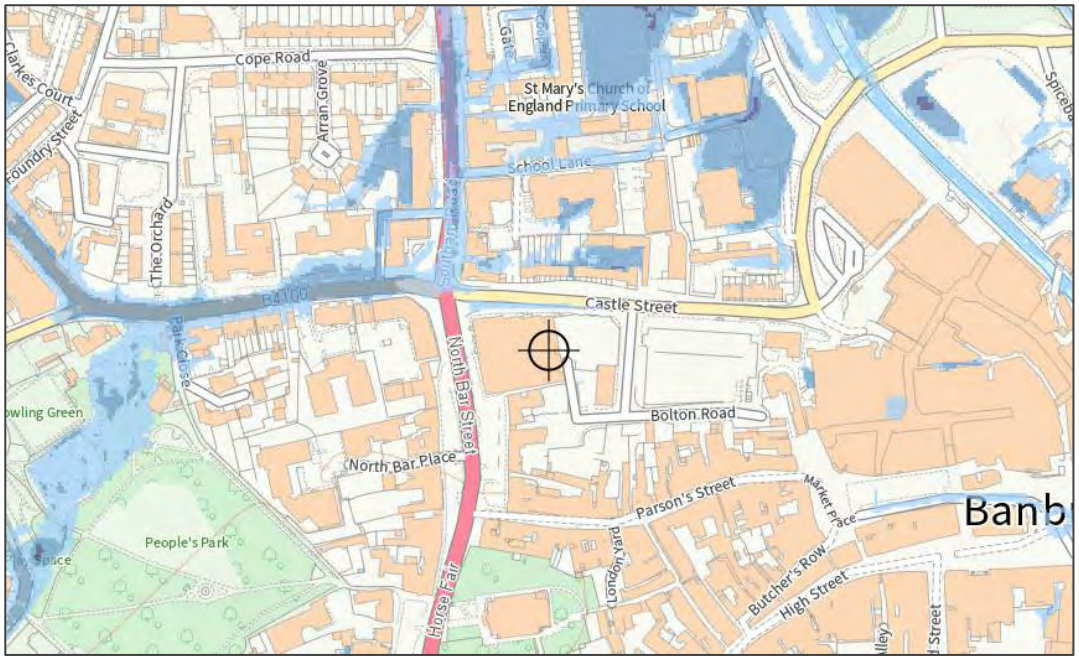


Figure 2.3 – EA Flooding from surface water (medium risk, 1%)



2.4 The mapping identifies that the northern boundary of the site may be susceptible to flooding below 300mm within the 100 year design life of the scheme (medium risk). The same area is indicated to be at risk of flooding greater than 300mm during the low risk event (beyond the 1 in 1,000 year event).

2.5 The developable extents of the site remain at a higher elevation above Castle Street and are therefore not at risk of flooding in either event.

2.6 It is important to note that the mapping ignores the presence of existing drainage infrastructure, which might otherwise serve the site and surrounding developments. It is therefore considered that this mapping represents a conservative assessment.

2.7 The site does not fall within a groundwater flood risk area or lie within the maximum extent of flooding from any reservoirs and there are no known on-site flood risks associated with infrastructure failure.

Ground Conditions

2.8 Crossfield Consulting have prepared a Ground Investigation Report, GIR (ref. CCL03458.C005), dated August 2021, which identifies potential constraints to redevelopment relating to the ground conditions and including a risk-based environmental assessment and recommendations for remediation works, foundations, road pavement design and general construction advice.

2.9 The investigation identified that ground conditions consist of:

- Made Ground from ground level to depths ranging from 1.0m to 2.4m consisting of various surfacing underlain by a sandy gravel subbase over variably sandy gravelly, locally organic, clay.

- River Terrace Deposits on the eastern half of the site only, to depths between 2.7m and 3.3m.

- Charmouth Mudstone Formation are present as the substrata reported as firm to stiff clays.

2.10 Groundwater was encountered at depths of 4.1m and 5.2m in two exploratory holes. The investigation also identified localised perched groundwater at the time of the investigation and noted damp materials at depths approximately 2.5m below ground level. Therefore, based on the recorded groundwater conditions and the impermeable substrata, it is concluded that soakaway based drainage would not be viable as also concluded in the GIR (August, 2021).

2.11 Extracts from the Ground Investigation Report can be found in Appendix B of this report.

Existing Site Drainage

2.12 There are no apparent nearby surface water features or watercourses. The Thames Water (TW) records are extracted in Figure 2.4 below which identifies that there are existing surface and foul sewers within Castle Street and North Bar Street to the north and west of the site. There are also combined sewers and gullies indicated south of the site, but these are not operated by TW (ownership is unknown). A full copy of TW records can be found within Appendix C of this report.

Figure 2.4 – Thames Water sewer asset record

2.13 A utility survey has been completed for the site which identifies existing foul and surface water drainage, with separate discharges to the adopted sewers within Castle Street.

2.14 The existing site drainage also receives separate private foul and storm connections from the adjacent commercial unit (Land Tyre Service). Whilst the existing site drainage can be abandoned, any live connections from other developments will need to be retained or otherwise diverted to accommodate the proposed development.

2.15 A CCTV condition survey has been conducted by Utilities Survey Ltd. (CCTV report ref. 071398, August, 2021). The 150mm diameter foul sewer connection to be retained (F4 to F5) is in good condition and is therefore considered adequate for re-use. The 225mm diameter surface water sewer connection from S7 to Mains are reported as DRB Grade: C, due to a large

joint displacement. Thus, there is a defect that requires remedial works before the existing surface water connection can be deemed serviceable.

2.16 The CCTV survey report is included within Appendix D of this report.

Existing surface water runoff

2.17 The existing site consists of a hard paved parking area and roof space, with minor landscaping areas to the north of the building along Castle Street, overall ~98% impermeable catchment.

2.18 The existing site does not comprise any existing attenuation. Instead, flows are limited by the 225mm outflow pipe linking to the existing surface water sewer network (estimate 40 l/s pipe-full capacity). Excess flows would overwhelm the system and flow overland towards Castle Street.

2.19 The existing brownfield rates have been estimated based on the Modified Rational Method (HR Wallingford, 1990), with a Hydrological Region 6, rainfall intensity of 57.6 mm/hr and growth curves taken from CIRIA C753. The results can be seen within in Table 2.2 below.

Table 2.2 – Estimated Brownfield Runoff Rates (0.49ha)

Return Period	Brownfield Rate (l/s)
2 year	69.0
30 years	188.3
100 years	250.3

2.20 Oxfordshire County Council's (OCC) 'Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire' (OCC SWDG, Nov 2018) states under National Standards for Peak Flow Control (S3): "*For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to the redevelopment*".

2.21 The equivalent greenfield runoff rates for the site have been calculated using FEH, with the results summarised within Table 2.1 and the calculation sheet included within Appendix E of this report.

Table 2.1 – Equivalent Greenfield Runoff Rates (0.37ha)

Return Period	Greenfield Rate (l/s)
1 year	0.7
30 years	1.9
100 years	2.6

2.22 It is proposed that peak flows from the site are limited to greenfield rates as far as is practicable. In this instance limiting peak flows well below 1 l/s would require an impractically small control with increased risk of blockage, instead it is proposed to limit flows based on a minimum vortex flow control diameter of 100mm. This follows Sewer Sector Guidance where it recommends 100mm minimum control diameter where there is a risk of debris passing through the control.

2.23 Local Standard L3 states: "*For brownfield or previously developed sites, where it is proposed to discharge runoff at rates greater than greenfield rates, evidence will be required to demonstrate why it is not feasible to achieve greenfield rates. The capacity of any existing drainage system within the site should also be assessed to determine the current discharge rates.*" Additional local guidance: "*As a minimum, brownfield sites should reduce the discharge by 40% to account for the impacts of climate change, from the existing site runoff OR from the original un-surcharged pipe-full capacity of the existing system, whichever is the lowest.*"

2.24 It is considered that use of a 100mm diameter vortex flow control will restrict peak flows as close to greenfield rates as is practicable, whilst ensuring that flows are significantly below the existing brownfield rates (250 l/s) and pipe-full capacity of the existing system (40 l/s).

2.25 Any off-site drainage connections, new or retained, would need to be agreed with OCC LLFA and TW.

3 Development Proposal

3.1 The development proposes to demolish the existing building and car parking area to enable the construction of a new apartment building which comprises 80 new retirement apartments and associated facilities, parking, and landscaping.

3.2 A copy of the proposed site layout has been included within Appendix F of this report.

4 Surface Water Management Plan

4.1 The site is 0.49ha (less than 1ha) and is located within Flood Zone 1, therefore a Flood Risk Assessment is not required. This technical note has been prepared to assess any relevant flood risks and drainage constraints and to identify an appropriate drainage strategy for the proposed development.

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 (40%) providing betterment over existing conditions, where the rate and volume of runoff would continue to increase due to climate change in line with local standards (OCC SWDG, Nov 2018).

4.4 The Crossfield Consulting ground investigation has concluded that the underlying ground conditions are unsuitable for the use of soakaways (see Section 2). Instead, surface water runoff will be attenuated on-site and discharged to the nearest and most appropriate receiving system.

4.5 The existing Thames Water gravity sewer beneath Castle Street currently receives surface water runoff from the site, with peak flows restricted via the existing 225mm diameter connection drain.

4.6 The proposed scheme identifies a significant amount more permeable green space than the existing site, reducing the drained catchment from 0.487ha to 0.371ha, offering a 24% reduction.

4.7 There are no nearby watercourses or other surface water features therefore the proposed scheme looks to reuse the existing connection to the TW surface water system.

4.8 Due to the proposed development reducing the impermeable catchment there is no requirement for long-term storage, however in line with OCC guidance the surface water strategy seeks to limit peak flows as close to greenfield rates as is practicable, based on a minimum 100mm diameter control.

4.9 Where possible, runoff from the access road will be directed towards areas of under-drained permeable paving. The use of under-drained permeable paving will be limited to the proposed parking bays within the central and eastern parking court. The paving is included as a pollution control measure and also forms part of the 1 in 100 year attenuation system.

4.10 Runoff generated by the southern extents of building, external hard paving and any residual access road will be collected and drained towards a new cellular attenuation tank beneath the proposed car park to the south of the building. The tank will also receive flows from the under-drained permeable paving.

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

4.12 Runoff generated by the northern extents of building will drain towards an oversized pipe within the amenity space at the northern edge of site.

4.13 The proposed attenuation features will be linked by a balance pipe spanning beneath the groundfloor slab. Runoff from the tank, and enlarged diameter pipe, will pass through the new flow control chamber prior to discharging to the retained existing surface water chamber (S7) from which it will discharge to the TW surface water network via the existing lateral site connection. This will be subject to remedial works to correct a joint displacement, based on the CCTV condition report discussed in Section 2.

4.14 The MicroDrainage source control module has been used to determine the 100 year +40% climate change storage requirements for the development. The output of this exercise has been summarised within Table 4.1 below, with copies of the modelling outputs included within Appendix G.

Table 4.1 – Attenuation Storage Volumes

Attenuation Feature	Attenuation Volume m³
Cellular Tank	99.0
450mm diameter Pipe	6.0
Under-Drained Permeable Paving	26.3
Total	**131.3**

4.15 The proposed development offers significant betterment compared to existing brownfield conditions, with peak rates of discharge limited to just 5.2 l/s peak in the 100 year return period storm with 40% climate change, compared to 40 l/s from the 225mm lateral connection alone (87% betterment), or 250 l/s from the full brownfield catchment (98% betterment).

4.16 The existing private storm connection from the adjacent commercial unit (Land Tyre Service) will be diverted within the site boundary to avoid conflict with the proposed development. Where possible it is recommended that this is dealt with privately on-site to avoid a S185 sewer diversion application. However, if this is not feasible the existing drainage could be diverted as an adopted sewer beneath Bolton Road to the network within Castle Street.

4.17 It is understood that Trelawn House, to the west of the proposed development, is served by a separate surface water network. If during demolition it is found that this property is served by the existing site drainage, a retained connection will be permitted. This will provide attenuation and reduced discharge under normal operating conditions. A high level overflow would be installed in the control chamber at the top water level, so that excess flows from Trelawn House can continue downstream without flooding.

4.18 Beyond the 100-year critical storm, exceedance runoff will be directed towards any residual areas of open space and/or the proposed car park, where any residual capacity within the under-drained permeable pavement can be utilised, and aboveground storage thereafter.

4.19 Beyond the limits of the site, exceedance flows would continue to the natural low point along the northern boundary.

4.20 A copy of the preliminary drainage layout can be found on drawing 1260-01-PDL-1001 included within Appendix H.

Long-Term Storage

4.21 The proposed developments provides a significant reduction in the impermeable drained catchment, resulting in the volume of runoff from the site decreasing. It is therefore considered that Long-Term Storage is not necessary in this instance.

5 Foul Water Strategy

5.1 Foul flows generated by the proposed development will drain through a new private gravity foul network and will utilise the existing connections to the TW foul sewer network, located to the north of the development.

5.2 A foul capacity enquiry has been submitted to TW to confirm capacity within the foul sewer network beneath Castle Street.

5.3 Under-slab connections for apartments on the western side of the proposed development, facing North Bar Street, are required due to the space constraints between the building and site boundary. Similarly, the private foul system runs under the building from south to north due to boundary constraints.

5.4 The existing private foul connection from the adjacent commercial unit (Land Tyre Service) will be diverted within the site boundary to avoid conflict with the proposed development. Where possible it is

recommended that this is dealt with privately on-site to avoid a S185 sewer diversion application. However, if this is not feasible the existing drainage could be diverted as an adopted sewer beneath Bolton Road to the network within Castle Street.

5.5 The proposed foul drainage arrangements can be seen on the preliminary drainage layout drawing 1260-01-PDL-1001 within Appendix H.

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 also be retained under private ownership and operated and maintained by the operator in accordance with CIRIA C753 and any manufacturer specific guidance.

6.3 At the detailed design stage, a 'Drainage Maintenance Plan' will be prepared. The Plan will 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 development is located within Flood Zone 1 and is not known to be susceptible to flooding from pluvial, groundwater, infrastructure or artificial sources.

7.3 To ensure the development is safe 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 (40%), providing betterment over existing conditions, where the rate and volume of runoff would continue to increase due to climate change.

7.5 The existing ground conditions preclude the use of soakaways. Instead, storm water runoff will be attenuated on-site and will discharge via the existing site connection to the TW stormwater sewer to the north of the site within Castle Street.

7.6 The impermeable drained catchment will reduce though the development, also reducing the peak rates and volumes of runoff from the site.

7.7 The attenuation requirements for the site are being delivered by a combination of cellular attenuation, oversized pipe and under-drained permeable pavements. The use of permeable pavements will offer treatment of runoff from trafficked areas prior to discharge.

7.8 The proposed drainage strategy for this site reduces peak flows as close to the equivalent greenfield rates as is practicable, providing significant betterment compared to existing brownfield conditions.

7.9 A pre-application enquiry has been issued to TW to agree to the re-use of existing sewer connections.

7.10 Beyond the 100-year critical storm, exceedance runoff will be directed towards any residual areas of open space and/or car parking, where any residual capacity or aboveground storage can be utilised.

7.11 Foul flows generated by the proposed development will be served by a new private gravity network, with new connections proposed to the TW network to suit the site layout.

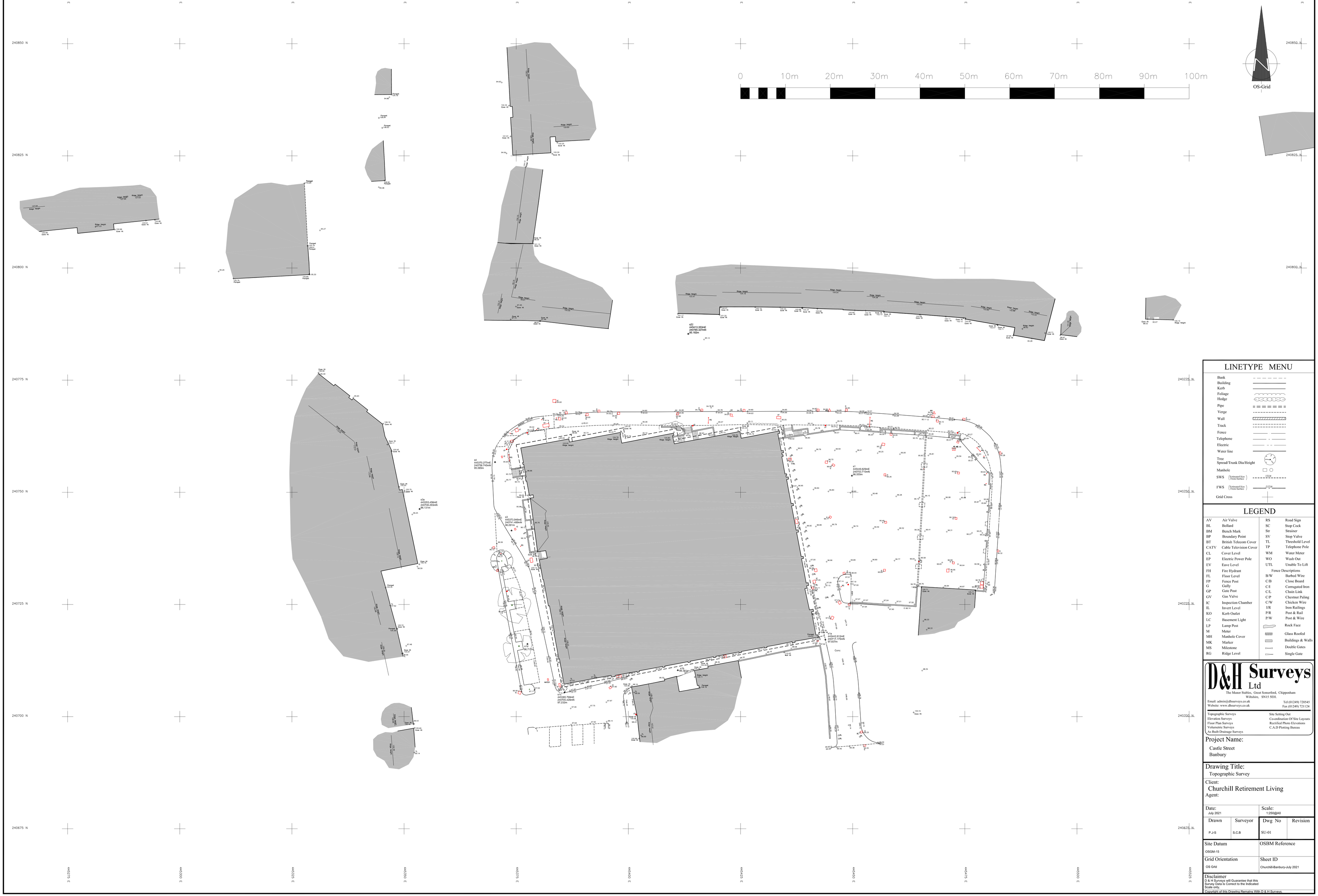
7.12 Existing drainage connections from the commercial building to the southeast of the development (Land Tyre Service) will be retained and diverted to avoid conflict with the development. Where possible it is recommended that this is dealt with privately on-site to avoid a S185 sewer diversion application.

7.13 Any potential drainage connections from Trelawn House would be accommodated by the proposed development, with the ability to introduce a high-level weir within the stormwater network to assist in managing any additional inflows from Trewlawn House roof catchment.

7.14 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.

7.15 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



LINETYPE MENU

Bank
Building
Kerb
Foliage
Hedge
Pipe
Verge
Wall
Track
Fence
Telephone
Electric
Water line
Tree
Spread/Trunk Dia/Height
Manhole ☐ ○
SWS (Estimated Size From Surface) 150ø
FWS (Estimated Size From Surface) 225ø
Grid Cross

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
CATV	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 Board
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		

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
Elevation Surveys
Floor Plan Surveys
Volumetric Surveys
As Built Drainage Surveys

Site Setting Out
Co-ordination Of Site Layouts
Rectified Photo Elevations
C.A.D Plotting Bureau

Project Name:
Castle Street
Banbury

Drawing Title:
Topographic Survey

Client:
Churchill Retirement Living
Agent:

Date: July 2021	Scale: 1:250@A0

Drawn	Surveyor	Dwg No	Revision
P.J-S	S.C.B	SU-01	

Site Datum OSGM-15	OSBM Reference
Grid Orientation OS Grid	Sheet ID Churchill-Banbury-July 2021

Disclaimer
D & H Surveys will Guarantee that this Survey Data is Correct to the Indicated Scale only.

Appendix B Ground Investigation (Extracts)

4. DESK STUDY ENQUIRIES

Detailed desk study information is presented in the Desk Study Appraisal by Crossfield Consulting Limited. A summary of relevant information is provided below.

The Groundsure Environmental Database indicates that there are no active or historical landfills recorded within 250 m of the site.

Hydrogeological information indicates that there are no superficial deposits aquifer strata below the site. Bedrock aquifer strata underlying the site are classified as 'Secondary Undifferentiated' aquifer strata.

There are no records of surface or underground mineral workings within 1 km of the site and there are no records of mining or mining cavities within the same search radius.

Within the section of the site occupied by the building, the exploratory hole records in the Desk Study Appraisal report (obtained from the BGS) indicate a thickness of Made Ground up to 1.5 m depth. Beneath the Made Ground 'firm' brown clays are recorded that quickly become 'stiff' and grey with depth with occasional lenses of silt and becoming 'very stiff' with partings of mudstone below approximately 5 m depth.

BRE BR211 (2015) and the Groundsure report (based on BGS/Public Health England data) indicate that the site is within an area where radon precautions are not required 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

Concrete was encountered immediately below the block paving in the northwest corner and towards the south of the car parking (possibly associated with a historical yard area). No other buried obstructions or services were encountered during the investigation. However, services are known to be below the site and obstructions should be anticipated associated with current and historical structures.

5.3 Strata Encountered

Made Ground
Made Ground was encountered from ground level down to depths of between 1.0 m and 2.4 m. An initial layer of tarmac-surfacing (in the east of the car park), and block paving and localised concrete (in the west of the car park) was underlain by a layer of sandy gravel subbase with low to medium cobble content. Generally, beneath the subbase, variably sandy gravelly, locally organic, clay was encountered.

River Terrace Deposits
Predominantly within the eastern half of the site, River Terrace Deposits are present beneath the Made Ground, and are recorded to depths of between 2.7 m and 3.3 m. The deposits generally comprise soft to firm and firm consistency (low to medium strength) variably sandy and gravelly, silty clays with horizons of loose to medium

dense gravelly sand. With reference to the desk study information, these deposits appear to be largely absent from the western section of the site.

Charmouth Mudstone Formation
Charmouth Mudstone Formation strata are present beneath the Made Ground and/or River Terrace Deposits (where present) and are recorded down to the full depth of the investigation at approximately 5.0 m depth. These strata generally comprise firm to stiff and stiff consistency (medium to high strength), orange brown and greyish brown, locally sandy clays with some mudstone. At depth, generally below 4.7 m towards the east of the site, stiff consistency (high strength) grey silty clay was encountered.

Within the section of the site occupied by the building, the exploratory hole records in the Desk Study Appraisal report indicate a thickness of Made Ground up to 1.5 m depth. Beneath the Made Ground 'firm' brown clays are recorded that quickly become 'stiff' and grey with depth with occasional lenses of silt and becoming 'very stiff' with partings of mudstone below approximately 5 m depth.

5.4 Groundwater

Groundwater was encountered in two exploratory holes at depths of 4.1 m and 5.2 m. Localised perched water was encountered in one exploratory hole, an accurate measurement of the water level could not be obtained due to hole instability. It should also be noted that damp materials were recorded in the sample liners at depths of approximately 2.5 m, such that groundwater may also be located around this 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 four-storey block of retirement apartments
- Car parking
- Managed soft landscaping
- Electrical substation

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.

9.6 General Construction Advice

An allowance should be included for breaking out/removal of obstructions.

Following completion of any ground treatment/vibro works, excavations should be designed and undertaken so as to ensure that areas of ground treatment/stone columns are not loosened or disturbed.

Ground treatment works should be undertaken and monitored in conjunction with a suitable specification.

All formations should be cleaned, and subsequently inspected by a suitably qualified engineer prior to placing foundation concrete and vibro "stone columns" should be confirmed to be correctly positioned (in compliance with the design and foundation requirements).

Foundation concrete, or alternatively, a blinding layer of concrete, should be placed immediately after excavation and inspection in order to protect the formation against softening and disturbance.

Care should be taken to ensure that any existing services encountered are carefully and satisfactorily blocked to prevent water seeping through the drains and into any excavations.

10. TEMPORARY WORKS

Conventional plant is considered appropriate for shallow excavation works at the site. However, the use of hydraulic breakers may be required to break up any remaining buried concrete materials or buried hard surfacing or other obstructions that may remain from previous developments.

Shallow excavations may remain stable in the short term, although some loose Made Ground materials have been encountered, and additional investigation and review of temporary works/support requirements is recommended. Instability should be anticipated in any excavations left open for extended periods of time, particularly during inclement weather. Support should be provided, or the sides battered back, in any excavations requiring man entry, in compliance with a suitable risk assessment. Likewise, support is likely to be necessary in deeper excavations and where groundwater seepages occur.

Groundwater may be encountered within assumed excavation depths for the development and, there is a possibility that perched water may locally be encountered. If water does enter excavations, sump pumping may be required. As outlined above, additional review of temporary works requirements is recommended following the additional investigation outlined in Section 14.

If large plant is proposed (including vibro equipment) then a temporary working platform should be provided for the specific plant to be used, in compliance with the requirements of FPS (2002) and BRE BR470 (2004).

11. ASSESSMENT OF SOAKAWAY DRAINAGE

Based on the presence of low permeability strata beneath the site, together with relatively deep Made Ground and evidence of shallow groundwater, and with reference to the guidance published in BRE DG365 (2016) and CIRIA C753 (2015), it is considered that soakaway drainage is not suitable for the proposed development and an alternative SuDS drainage solution should be identified.

Appendix C Thames Water Records

Asset location search

Thames Water Property Searches

NRSWA Ltd
The Rosery
Odiham Road
READING
RG7 1SD

Search address supplied

Bingo Hall
Bolton Road
Banbury
Oxfordshire
OX16 0TH

Your reference Banbury

Our reference ALS/ALS Standard/2021_4472919

Search date 22 July 2021

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Asset location search

Property Searches

Search address supplied: Bingo Hall, Bolton Road, Banbury, Oxfordshire, OX16 0TH

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset location search

Thames Water Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

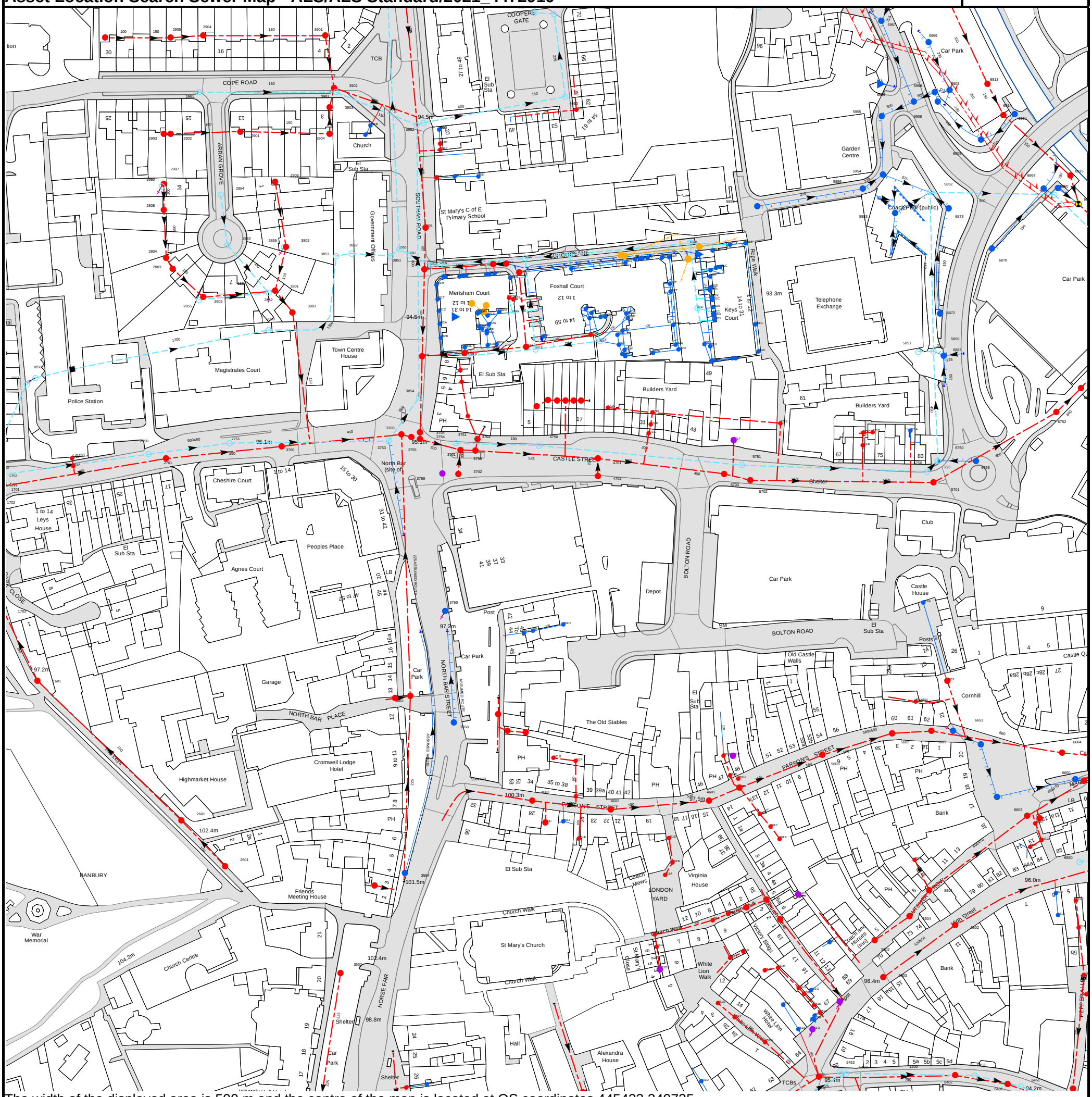
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4472919



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 445423,240735

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
6914	91.7	91.17
6904	n/a	n/a
5956	n/a	n/a
6906	n/a	n/a
5958	n/a	n/a
6903	n/a	n/a
6913	92.1	91.36
5959	n/a	n/a
5957	n/a	n/a
5951	92.65	91.15
4952	93.31	91.49
4951	93.09	91.61
581F	93.5	93.1
5851	92.64	91.38
5850	92.6	91.03
581G	93.5	92.93
6872	n/a	n/a
6870	n/a	n/a
581E	93.5	92.67
5853	n/a	n/a
6873	n/a	n/a
5855	n/a	n/a
6859	92	90.12
6860	n/a	n/a
5852	n/a	n/a
5856	n/a	n/a
6867	n/a	n/a
681A	n/a	n/a
6915	91.5	90.72
5954	n/a	n/a
6905	n/a	n/a
5955	n/a	n/a
6602	94.01	91.64
6650	93.98	92.31
561H	n/a	n/a
5603	96.38	93.71
6604	94.24	91.39
661A	n/a	n/a
5602	95.68	92.55
5601	95.16	92.19
6651	94.96	92.28
561A	n/a	n/a
6652	n/a	n/a
571G	n/a	n/a
5701	94.45	91.12
5702	94.95	91.22
5750	94.37	91.84
5751	94.96	92.54
6753	n/a	n/a
6750	94.09	91.55
571B	n/a	n/a
571C	n/a	n/a
571D	n/a	n/a
571A	n/a	n/a
571E	n/a	n/a
6752	n/a	90.9
6862	n/a	88.49
6863	n/a	n/a
6403	94.03	91.6
6451	94.2	91.74
6401	94.23	90.73
6452	94.33	92.04
6402	94.39	91.12
551W	n/a	n/a
651E	n/a	n/a
5503	96.46	93.4
6503	95.29	92.46
5502	96.49	93.87
651F	n/a	n/a
6502	96.27	92.78
5504	96.25	93.67
651A	n/a	n/a
651D	n/a	n/a
651B	n/a	n/a
5501	95.95	93.59
6550	94.99	93.84
551L	n/a	n/a
651C	n/a	n/a
661C	n/a	n/a
661D	n/a	n/a
6653	n/a	n/a
6603	94.69	92.24
661B	n/a	n/a
3502	102.57	100.16
341B	n/a	n/a
341A	n/a	n/a
441A	n/a	n/a
451C	n/a	n/a
451E	n/a	n/a
451D	n/a	n/a
441D	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
451F	n/a	n/a
551U	n/a	n/a
551S	n/a	n/a
551V	n/a	n/a
5604	97.13	94.28
551I	n/a	n/a
5506	n/a	n/a
561D	n/a	n/a
551G	n/a	n/a
5507	n/a	n/a
561C	n/a	n/a
551H	n/a	n/a
561B	n/a	n/a
5508	n/a	n/a
551A	n/a	n/a
551R	n/a	n/a
551B	n/a	n/a
551C	n/a	n/a
551D	n/a	n/a
551Q	n/a	n/a
551O	n/a	n/a
551M	n/a	n/a
551E	n/a	n/a
551N	n/a	n/a
5401	95.54	91.83
551F	n/a	n/a
551J	n/a	n/a
5452	95.41	93.66
551P	n/a	n/a
5450	95.31	93
482Y	93.85	93.3
482A	93.5	92.82
482U	93.96	93.2
482J	n/a	n/a
481I	93.37	92.62
482B	93.5	92.82
482C	93.5	92.82
482K	n/a	n/a
483T	93.76	93.32
482D	93.5	92.82
482L	n/a	n/a
482E	93.5	92.82
482T	93.76	93.42
482F	93.5	92.82
482M	n/a	n/a
482G	93.5	92.78
581C	93.5	92.82
481L	n/a	n/a
483M	93.96	93.32
483L	93.8	93.34
483K	93.8	93.4
482P	n/a	n/a
483J	93.76	93.46
481K	93.76	92.76
481O	n/a	n/a
581A	93.5	92.58
481H	93.23	92.33
5703	94.97	91.46
4701	95.13	91.75
571F	n/a	n/a
471C	n/a	n/a
471D	n/a	n/a
471B	n/a	n/a
471A	n/a	n/a
482H	93.5	93
481W	93.5	92.55
581D	93.5	93.1
581B	93.5	92.82
482X	93.76	93.25
483G	93.76	93.05
482N	93.76	93.25
482W	93.76	93.21
482O	93.76	93.04
481X	93.5	92.55
482Q	93.76	93.36
483F	93.76	92.95
481J	93.5	92.85
481F	93.66	92.12
483E	93.76	93.25
482V	93.76	93.04
482R	93.87	93.19
482I	n/a	n/a
483D	93.98	93.2
482Z	93.76	93.25
382E	94.81	93.91
382G	94.7	93.85
483B	93.76	93.15
381S	94.6	94
381P	n/a	n/a
483H	93.76	92.75
481V	94.6	93.7
382C	94.6	93.88
382D	94.6	93.88

Manhole Reference	Manhole Cover Level	Manhole Invert Level
483A	93.76	93.3
483S	93.61	93
483R	94.6	92.9
481N	n/a	n/a
381U	94.6	93.91
381L	94.6	93.98
381V	94.6	93.91
381K	94.6	94
381W	94.6	93.91
381X	94.6	93.91
381J	n/a	n/a
381Y	94.6	93.91
481B	94.11	92.96
481M	n/a	n/a
381E	94.07	92.89
481C	94	92.94
481D	93.92	92.09
481G	93.73	92.26
3702	94.89	92.82
3759	n/a	n/a
3756	95.07	91.6
3701	95.07	91.85
4750	95.04	93.3
3751	95	93.65
3764	95.14	91.82
3766	n/a	n/a
4801	n/a	n/a
4806	n/a	n/a
4805	n/a	n/a
4803	n/a	n/a
4804	n/a	n/a
4802	n/a	n/a
3856	n/a	n/a
382M	n/a	n/a
381H	94.3	92.85
381C	94.19	92.54
481E	93.49	91.89
382L	94.6	93.91
481A	93.49	92.73
381R	93.54	92.94
382H	94.6	93.85
483I	93.61	92.9
483C	93.76	92.93
381Q	94.81	93.85
382F	94.81	93.85
381O	n/a	n/a
3555	n/a	n/a
361A	n/a	n/a
3554	n/a	n/a
3602	99.5	96.52
3750	97.63	96.55
3650	99.58	n/a
3601	98.95	96.17
4605	n/a	n/a
461C	n/a	n/a
4604	n/a	n/a
4603	100.1	96.76
461B	n/a	n/a
461I	n/a	n/a
461G	n/a	n/a
461H	n/a	n/a
461J	n/a	n/a
461F	n/a	n/a
461A	n/a	n/a
461E	n/a	n/a
4702	94.92	92.75
4602	98.87	95.85
451A	n/a	n/a
461D	n/a	n/a
451B	n/a	n/a
4601	97.42	94.59
561G	n/a	n/a
551K	n/a	n/a
561F	n/a	n/a
561E	n/a	n/a
2852	94.63	93.79
2801	94.63	93.67
3760	n/a	n/a
3855	94.77	94.08
3802	94.78	94.08
3803	95.24	93.29
3853	94.31	90.87
3852	94.53	90.78
3753	95.19	n/a
3851	94.55	90.91
3850	94.5	90.7
3703	95.28	91.86
381I	94.4	91.03
3755	n/a	n/a
3854	94.75	91.64
3704	94.96	92.07
3754	n/a	n/a
381B	94.4	92.32

Manhole Reference	Manhole Cover Level	Manhole Invert Level
381D	94.4	92.6
3801	94.23	92.71
381F	94.32	91.07
381M	94.6	94.03
381T	n/a	n/a
381Z	94.6	93.91
381N	94.29	n/a
382A	94.6	93.83
382B	94.6	93.72
2854	95.86	94.71
2950	96.71	95.84
2907	96.7	95.75
2908	n/a	n/a
391L	n/a	n/a
391J	n/a	n/a
391I	n/a	n/a
391E	n/a	n/a
391D	n/a	n/a
391A	n/a	n/a
2902	97.33	96.3
2903	97.66	96.45
3904	95.67	94.39
2901	96.07	95.07
391C	n/a	n/a
391B	n/a	n/a
3952	94.37	91.49
3950	94.32	91.47
491B	n/a	n/a
3903	95.55	94.3
4950	93.91	91.09
3951	95.41	93.94
2951	97.33	96.18
3902	95.45	94.1
2905	99.02	98.11
2904	96.77	95.76
3901	95.85	94.64
1851	95.82	91.35
1850	95.76	91.26
1601	97.24	96.87
271B	n/a	n/a
271A	n/a	n/a
2750	95.25	94.23
2805	96.43	95.37
2701	95.26	92.17
2804	95.75	94.76
2803	95.48	94.62
2601	99.6	99.06
2855	95.29	n/a
2802	95.3	94.31
2501	102.6	102.16
2853	95.33	94.41
2751	n/a	n/a
2850	95.36	91.06
L	99.25	98.41

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2021_4472919

The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 445423, 240735.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

General Purpose Valve

Air Valve

Pressure Control Valve

Customer Valve

Hydrants

Single Hydrant

Meters

Meter

End Items

Symbol indicating what happens at the end of a water main.

Blank Flange

Capped End

Emptying Pit

Undefined End

Manifold

Customer Supply

Fire Supply

Operational Sites

Booster Station

Other

Other (Proposed)

Pumping Station

Service Reservoir

Shaft Inspection

Treatment Works

Unknown

Water Tower

Other Symbols

Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0800 009 4540** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Appendix D CCTV Drainage Survey

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	FORMER BUZZ BINGO BOULTON ROAD BANBURY OX16 0TH
DATE	10/08/2021
REF	071398

CONTENTS

REGISTER OF APPENDICES

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 10 August 2021.

CONTACT INFORMATION

SITE ADDRESS: **FORMER BUZZ BINGO** **BOULTON ROAD** **BANBURY** **OX16 0TH**	**SITE CONTACT: N/A** **CONTACT NO:** **EMAIL:**
CLIENT DETAILS: **CHURCHILL RETIREMENT LIVING** **CHURCHILL HOUSE** **PARKSIDE** **RINGWOOD** **BH24 3SG**	**CONTACT: JAMES McCARTHY** **CONTACT NO: 01425 462312** **EMAIL:**

UTILITY SURVEYS LTD CONTACT DETAILS

OFFICE	**SIMON GARDINER** **07971 910370** **simon@utilitysurveysltd.co.uk**
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 PLC
CHURCHILL HOUSE
PARKSIDE
RINGWOOD
BH24 3SG

Site

FORMER BUZZ BINGO
BOLTON ROAD
BANBURY

OX16 0TH

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

Total Defects for Project

6 | 6 | 16 | 2 | 0

Total DRB Grades for Project

5 | 7 | 2

071398 Former Buzz Bingo Banbury - CCTV Survey Report : 10/08/21

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 PLC
Contact :	JAMES McCARTHY
Location :	CHURCHILL HOUSE
Town :	PARKSIDE
Region :	RINGWOOD
Postcode :	BH24 3SG
Tel :	01425 462312
Mobile :	
Email :	
Fax :	

Site Information

Name :	FORMER BUZZ BINGO
Contact :	
Location :	BOLTON ROAD
Town :	BANBURY
Region :	
Postcode :	OX16 0TH
Tel :	
Mobile :	
Email :	
Fax :	

Total Defects for Project

6 6 16 2 0

Total DRB Grades for Project

5 7 2

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: F1** **To: F2**	Grade A	**DRB Grade: A** **Pipe Size: 100** **Material: Vitrified Clay (i.e. all clayware)** **Use: Foul**
Section: 2 **From: F2** **To: F3**	Grade A	**DRB Grade: A** **Pipe Size: 100** **Material: Vitrified Clay (i.e. all clayware)** **Use: Foul**
Section: 3 **From: F3** **To: F4**	Grade B	**DRB Grade: B** **Pipe Size: 150** **Material: Vitrified Clay (i.e. all clayware)** **Use: Foul**
Section: 4 **From: F4** **To: F5**	Grade A	**DRB Grade: A** **Pipe Size: 150** **Material: Vitrified Clay (i.e. all clayware)** **Use: Foul**
Section: 5 **From: S1** **To: S2**	Grade B	**DRB Grade: B** **Pipe Size: 150** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 6 **From: S3** **To: S4**	Grade B	**DRB Grade: B** **Pipe Size: 150** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 7 **From: S4** **To: S5**	Grade A	**DRB Grade: A** **Pipe Size: 225** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 8 **From: S5** **To: S6**	Grade A	**DRB Grade: A** **Pipe Size: 150** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**

Total Defects for Project

Total DRB Grades for Project

Section: 9 **From: S4** **To: S7**	Grade B	**DRB Grade: B** **Pipe Size: 225** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 10 **From: S9** **To: S8**	Grade B	**DRB Grade: B** **Pipe Size: 150** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 11 **From: S9** **To: S10**	Grade B	**DRB Grade: B** **Pipe Size: 150** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 12 **From: S10** **To: PI1**	Grade C	**DRB Grade: C** **Pipe Size: 225** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 13 **From: S7** **To: MAIN**	Grade C	**DRB Grade: C** **Pipe Size: 225** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**
Section: 14 **From: S11** **To: S5**	Grade B	**DRB Grade: B** **Pipe Size: 225** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**

Site: BOLTON ROAD, BANBURY

Section 1

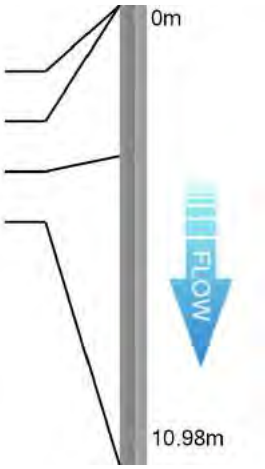
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	F1	Finish Node Ref:	F2	Direction:	D	Height/Dia:	100
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	10.98	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
03.60m	LRQ	Line of drain/sewer deviates right [quarter]			0:00:30
10.98m	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 F1	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
03.60m	0:00:30	LRQ	Line of drain/sewer deviates right [quarter]	
10.98m		MHF	Finish node type, manhole F2	

Site: BOLTON ROAD, BANBURY

Section 2

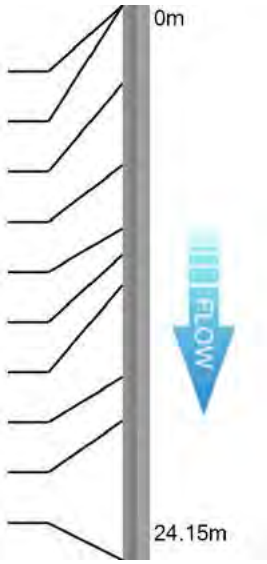
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	F2	Finish Node Ref:	F3	Direction:	D	Height/Dia:	100
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	24.15	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
03.40m	CL	Crack, longitudinal 12			0:00:32
06.95m	CL	Crack, longitudinal 10			0:00:55
09.70m	CM	S1 Cracks, multiple 06-06	S1	1_3	0:01:17
10.85m	CM	F1 Cracks, multiple 06-06	F1	1_-3	0:01:17
12.16m	CL	Crack, longitudinal 11			0:01:51
16.16m	CM	Cracks, multiple 07-03		1_6	0:02:24
18.06m	CM	Cracks, multiple 07-05		1_7	0:02:40
24.15m	MHF	Finish node type, manhole			



Total Defects for section

3 4 0 0 0

DRB Grade for Section

A

Descriptive Report with Remarks and Observation Images

Section 2

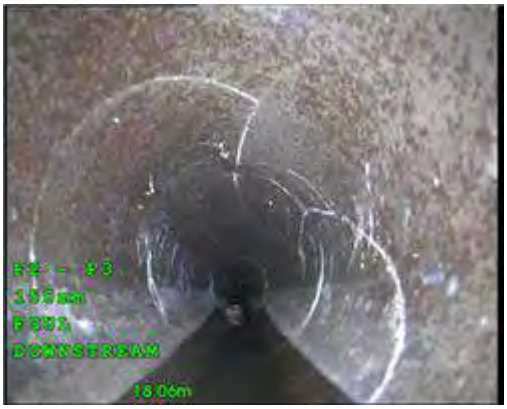
Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole F2	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
03.40m	0:00:32	CL	Crack, longitudinal at 12 o'clock - Severity 1	
06.95m	0:00:55	CL	Crack, longitudinal at 10 o'clock - Severity 1	
09.70m	0:01:17	S1 CM	Cracks, multiple 9.7m - 10.85m from 06 o'clock to 06 o'clock - Severity 2	Image Provided - Ref: 1_3 
10.85m	0:01:17	F1 CM	Cracks, multiple Defect End from 06 o'clock to 06 o'clock - Severity 2	
12.16m	0:01:51	CL	Crack, longitudinal at 11 o'clock - Severity 1	
16.16m	0:02:24	CM	Cracks, multiple from 07 o'clock to 03 o'clock - Severity 2	Image Provided - Ref: 1_6 

Total Defects for section

3	4	0	0	0

DRB Grade for Section

A

Pos	Video Ref	Code	Description	Image
18.06m	0:02:40	CM	Cracks, multiple from 07 o'clock to 05 o'clock - Severity 2	Image Provided - Ref: 1_7 
24.15m		MHF	Finish node type, manhole F3	

Site: BOLTON ROAD, BANBURY

Section 3

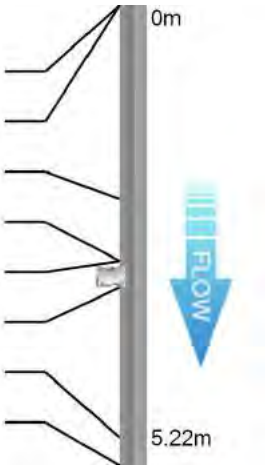
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	F3	Finish Node Ref:	F4	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	5.22	

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	WL	Water level 10%			0:00:26
02.90m	JDM	Joint displaced medium			0:00:30
02.90m	WL	Water level 20%			0:00:30
03.20m	JN	Junction 03 : 150mm Diameter			0:00:35
04.90m	JN	Junction 06 : 150mm Diameter		2_6	0:01:15
05.22m	MHF	Finish node type, manhole			



Total Defects for section

0	0	1	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 F3	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
02.20m	0:00:26	WL	Water level: 10% Height/Diameter	
02.90m	0:00:30	JDM	Joint displaced medium - Severity 3	
02.90m	0:00:30	WL	Water level: 20% Height/Diameter	
03.20m	0:00:35	JN	Junction at 03 o'clock: 150mm Diameter	
04.90m	0:01:15	JN	Junction at 06 o'clock: 150mm Diameter BACKDROP AT MANHOLE	Image Provided - Ref: 2_6 
05.22m		MHF	Finish node type, manhole F4	

Total Defects for section

0 0 1 0 0

DRB Grade for Section

B

Site: BOLTON ROAD, BANBURY

Section 4

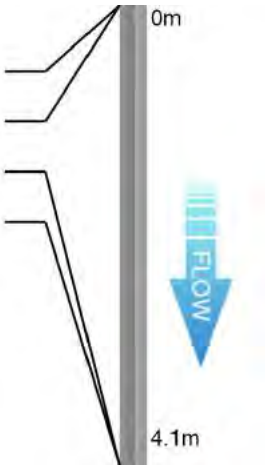
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	F4	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	4.1	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
04.10m	REM	General remark		3_2	0:00:33
04.10m	MHF	Finish node type, manhole			



Total Defects for section

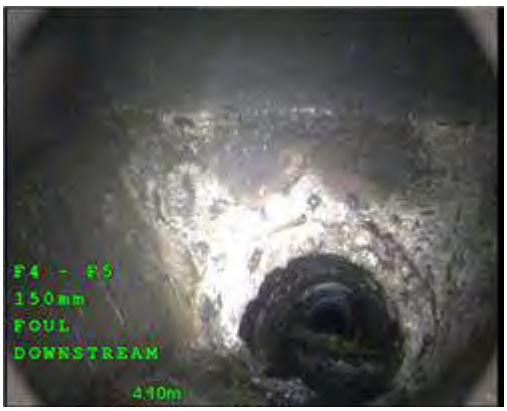
0 0 0 0 0

DRB Grade for Section

A

Descriptive Report with Remarks and Observation Images

Section 4

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole F4	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
04.10m	0:00:33	REM	General remark ENTERS MANHOLE F5	Image Provided - Ref: 3_2 
04.10m		MHF	Finish node type, manhole F5	

Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

Site: BOLTON ROAD, BANBURY

Section 5

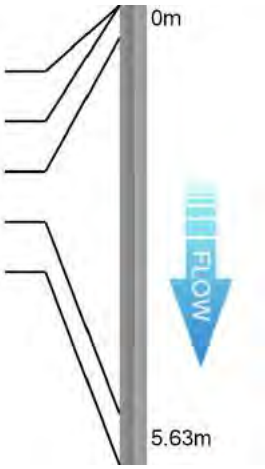
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S1	Finish Node Ref:	S2	Direction:	D	Height/Dia:	150
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	5.63	

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	DES	Settled deposits fine 40%			0:00:00
05.00m	DES	Settled deposits fine 50%			0:01:01
05.63m	SA	Survey abandoned			



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 S1	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
00.40m	0:00:00	DES	Settled deposits fine: 40% Cross sectional area loss - Severity 3	
05.00m	0:01:01	DES	Settled deposits fine: 50% Cross sectional area loss - Severity 3	
05.63m		SA	Survey abandoned UNABLE TO PASS DEBRIS	

Site: BOLTON ROAD, BANBURY

Section 6

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S3	Finish Node Ref:	S4	Direction:	D	Height/Dia:	150
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	27.01	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
02.00m	JN	Junction 10 : 100mm Diameter			0:00:19
11.94m	JN	Junction 10 : 100mm Diameter			0:02:14
15.80m	DER	Settled deposits coarse 20%			0:02:48
17.60m	JN	Junction 10 : 100mm Diameter			0:03:19
24.70m	JN	Junction 10 : 100mm Diameter			0:04:24
27.01m	MHF	Finish node type, manhole			

Total Defects for section

0	0	1	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 S3	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
02.00m	0:00:19	JN	Junction at 10 o'clock: 100mm Diameter	
11.94m	0:02:14	JN	Junction at 10 o'clock: 100mm Diameter	
15.80m	0:02:48	DER	Settled deposits coarse: 20% Cross sectional area loss - Severity 3	
17.60m	0:03:19	JN	Junction at 10 o'clock: 100mm Diameter	
24.70m	0:04:24	JN	Junction at 10 o'clock: 100mm Diameter	
27.01m		MHF	Finish node type, manhole S4	

Site: BOLTON ROAD, BANBURY

Section 7

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S4	Finish Node Ref:	S5	Direction:	U	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	23.23	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 0%			0:00:00
06.08m	JN	Junction 03 : 100mm Diameter			0:00:52
10.50m	JN	Junction 03 : 100mm Diameter			0:01:33
23.23m	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 7

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole S4	
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
06.08m	0:00:52	JN	Junction at 03 o'clock: 100mm Diameter	
10.50m	0:01:33	JN	Junction at 03 o'clock: 100mm Diameter	
23.23m		MHF	Finish node type, manhole S5	

Site: BOLTON ROAD, BANBURY

Section 8

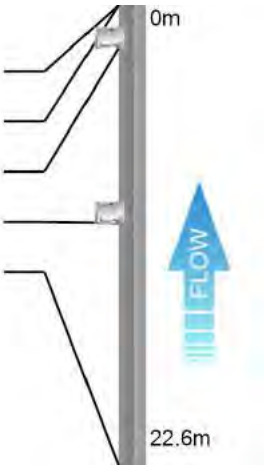
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S5	Finish Node Ref:	S6	Direction:	U	Height/Dia:	150
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	22.6	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
02.10m	JN	Junction 03 : 100mm Diameter			0:00:21
10.68m	JN	Junction 02 : 100mm Diameter			0:01:09
22.60m	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 8

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole S5	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
02.10m	0:00:21	JN	Junction at 03 o'clock: 100mm Diameter	
10.68m	0:01:09	JN	Junction at 02 o'clock: 100mm Diameter	
22.60m		MHF	Finish node type, manhole S6	

Site: BOLTON ROAD, BANBURY

Section 9

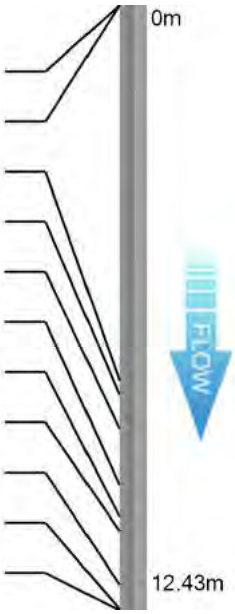
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S4	Finish Node Ref:	S7	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	12.43	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
07.70m	LRQ	Line of drain/sewer deviates right [quarter]			0:01:02
08.00m	DES	Settled deposits fine 10%			0:01:06
08.70m	WL	Water level 10%			0:01:14
09.85m	FCJ	Fracture circumferential 07-05 at joint			0:01:21
10.50m	WL	Water level 5%			0:01:30
10.80m	WL	Water level 0%			0:01:30
11.90m	JDM	Joint displaced medium			0:01:42
12.40m	LDF	Line of drain/sewer deviates down [full]			0:01:58
12.43m	MHF	Finish node type, manhole			



Total Defects for section

0	0	3	0	0

DRB Grade for Section

B

Descriptive Report with Remarks and Observation Images — Section 9

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole S4	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
07.70m	0:01:02	LRQ	Line of drain/sewer deviates right [quarter]	
08.00m	0:01:06	DES	Settled deposits fine: 10% Cross sectional area loss - Severity 3	
08.70m	0:01:14	WL	Water level: 10% Height/Diameter	
09.85m	0:01:21	FCJ	Fracture circumferential from 07 o'clock to 05 o'clock at joint - Severity 3	
10.50m	0:01:30	WL	Water level: 5% Height/Diameter	
10.80m	0:01:30	WL	Water level: 0% Height/Diameter	
11.90m	0:01:42	JDM	Joint displaced medium - Severity 3	
12.40m	0:01:58	LDF	Line of drain/sewer deviates down [full] BEND INTO MANHOLE	
12.43m		MHF	Finish node type, manhole S7	

Site: BOLTON ROAD, BANBURY

Section 10

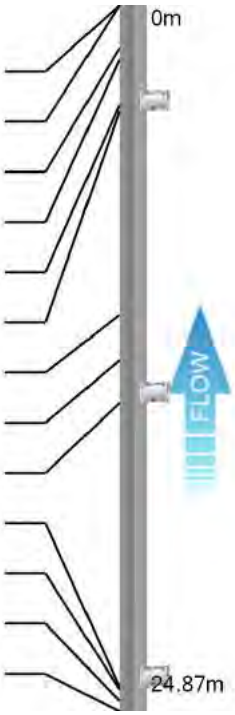
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S9	Finish Node Ref:	S8	Direction:	U	Height/Dia:	150
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	24.87	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 0%			0:00:00
01.50m	CL	Crack, longitudinal 01			0:00:13
01.90m	CM	S1 Cracks, multiple 08-04	S1		0:00:15
03.50m	CM	F1 Cracks, multiple 08-04	F1		0:00:15
03.73m	JN	Junction 10 : 150mm Diameter			0:00:31
10.90m	DES	S2 Settled deposits fine 20%	S2		0:01:29
12.50m	DES	F2 Settled deposits fine 20%	F2		0:01:29
14.00m	JN	Junction 10 : 150mm Diameter			0:02:03
24.00m	JN	Junction 10 : 100mm Diameter			0:03:31
24.10m	DER	Settled deposits coarse 60%			0:03:31
24.50m	DEE	Attached deposits, encrustation 03-09 40%			0:00:00
24.87m	SA	Survey abandoned			



Total Defects for section

1 2 4 0 0

DRB Grade for Section

B

Descriptive Report with Remarks and Observation Images — Section 10

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole S9	
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
01.50m	0:00:13	CL	Crack, longitudinal at 01 o'clock - Severity 1	
01.90m	0:00:15	S1 CM	Cracks, multiple 1.9m - 3.5m from 08 o'clock to 04 o'clock - Severity 2	
03.50m	0:00:15	F1 CM	Cracks, multiple Defect End from 08 o'clock to 04 o'clock - Severity 2	
03.73m	0:00:31	JN	Junction at 10 o'clock: 150mm Diameter	
10.90m	0:01:29	S2 DES	Settled deposits fine 10.9m - 12.5m: 20% Cross sectional area loss - Severity 3	
12.50m	0:01:29	F2 DES	Settled deposits fine Defect End: 20% Cross sectional area loss - Severity 3	
14.00m	0:02:03	JN	Junction at 10 o'clock: 150mm Diameter	
24.00m	0:03:31	JN	Junction at 10 o'clock: 100mm Diameter	
24.10m	0:03:31	DER	Settled deposits coarse: 60% Cross sectional area loss - Severity 3	
24.50m	0:00:00	DEE	Attached deposits, encrustation from 03 o'clock to 09 o'clock: 40% Cross sectional area loss - Severity 3	
24.87m		SA	Survey abandoned UNABLE TO PASS DEBRIS AND ENCUSTATION	

Site: BOLTON ROAD, BANBURY

Section 11

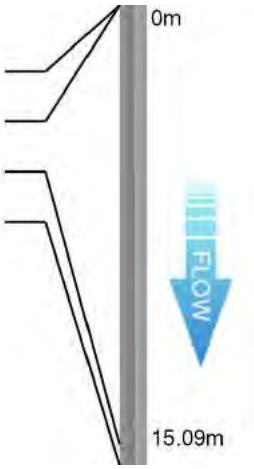
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S9	Finish Node Ref:	S10	Direction:	D	Height/Dia:	150
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	15.09	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
14.40m	JDM	Joint displaced medium			0:02:01
15.09m	MHF	Finish node type, manhole			



Total Defects for section

0	0	1	0	0

DRB Grade for Section

B

Descriptive Report with Remarks and Observation Images

Section 11

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole S9	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
14.40m	0:02:01	JDM	Joint displaced medium - Severity 3	
15.09m		MHF	Finish node type, manhole S10	

Site: BOLTON ROAD, BANBURY

Section 12

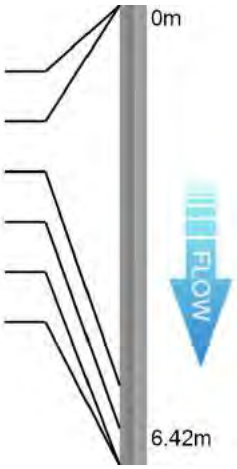
Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S10	Finish Node Ref:	PI1	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	6.42	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
05.30m	DER	Settled deposits coarse 20%			0:00:44
05.90m	FM	Fracture multiple 06-06			0:00:50
06.42m	LDF	Line of drain/sewer deviates down [full]			0:01:04
06.42m	MHF	Finish node type, manhole			



Total Defects for section

0	0	1	1	0

DRB Grade for Section

C

Descriptive Report with Remarks and Observation Images — Section 12

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole S10	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
05.30m	0:00:44	DER	Settled deposits coarse: 20% Cross sectional area loss - Severity 3	
05.90m	0:00:50	FM	Fracture multiple from 06 o'clock to 06 o'clock - Severity 4	
06.42m	0:01:04	LDF	Line of drain/sewer deviates down [full] BEND INTO MANHOLE	
06.42m		MHF	Finish node type, manhole PI1	

Site: BOLTON ROAD, BANBURY

Section 13

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S7	Finish Node Ref:	MAIN	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	16.29	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 5%			0:00:00
01.20m	FC	Fracture circumferential 12-12			0:00:14
02.00m	CL	Crack, longitudinal 12			0:00:20
05.30m	CC	Crack, circumferential 07-05			0:00:47
07.20m	LDH	Line of drain/sewer deviates down [half]			0:01:06
08.50m	LDH	Line of drain/sewer deviates down [half]			0:01:16
10.00m	REM	General remark			0:01:32
16.00m	JDL	Joint displaced large		12_9	0:02:48
16.29m	WRF	Finish node type, major connection without			

Total Defects for section

2	0	1	1	0

DRB Grade for Section

C

Descriptive Report with Remarks and Observation Images — Section 13

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole S7	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
01.20m	0:00:14	FC	Fracture circumferential from 12 o'clock to 12 o'clock - Severity 3	
02.00m	0:00:20	CL	Crack, longitudinal at 12 o'clock - Severity 1	
05.30m	0:00:47	CC	Crack, circumferential from 07 o'clock to 05 o'clock - Severity 1	
07.20m	0:01:06	LDH	Line of drain/sewer deviates down [half]	
08.50m	0:01:16	LDH	Line of drain/sewer deviates down [half]	
10.00m	0:01:32	REM	General remark LINE LEVELS	
16.00m	0:02:48	JDL	Joint displaced large - Severity 4	Image Provided - Ref: 12_9 
16.29m		WRF	Finish node type, major connection without manhole JOINS MAIN	

Total Defects for section

2 | 0 | 1 | 1 | 0

DRB Grade for Section

C

Site: BOLTON ROAD, BANBURY

Section 14

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
CHURCHILL RETIREMENT PLC	BOLTON ROAD	BANBURY		Simon Gardiner	10/08/2021

Start Node Ref:	S11	Finish Node Ref:	S5	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	45.77	

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	DES	S1 Settled deposits fine 10%	S1		0:00:22
08.68m	JN	Junction 10 : 150mm Diameter			0:01:10
20.60m	JN	Junction 10 : 150mm Diameter			0:02:55
23.00m	DES	F1 Settled deposits fine 10%	F1		0:00:22
32.50m	JN	Junction 09 : 150mm Diameter			0:04:37
44.00m	LRQ	Line of drain/sewer deviates right [quarter]			0:06:30
44.60m	JN	Junction 09 : 150mm Diameter			0:06:33
45.77m	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 14

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole S11	
00.00m	0:00:00	WL	Water level: 5% Height/Diameter	
00.40m	0:00:22	S1 DES	Settled deposits fine 0.4m - 23m: 10% Cross sectional area loss - Severity 3	
08.68m	0:01:10	JN	Junction at 10 o'clock: 150mm Diameter	
20.60m	0:02:55	JN	Junction at 10 o'clock: 150mm Diameter	
23.00m	0:00:22	F1 DES	Settled deposits fine Defect End: 10% Cross sectional area loss - Severity 3	
32.50m	0:04:37	JN	Junction at 09 o'clock: 150mm Diameter	
44.00m	0:06:30	LRQ	Line of drain/sewer deviates right [quarter]	
44.60m	0:06:33	JN	Junction at 09 o'clock: 150mm Diameter	
45.77m		MHF	Finish node type, manhole S5	

A guide to defects and other observations in drainage systems

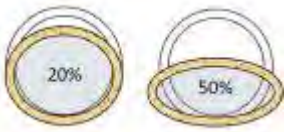
More detailed information can be found in the National Standard (BS EN 13508-1:2003) and in the Manual of Sewer Condition Classification (MSCC) 5th Edition, written by the Water Research Centre (WRc).

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	

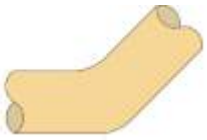
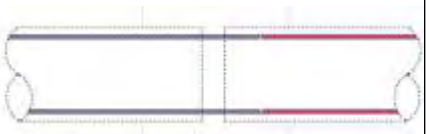
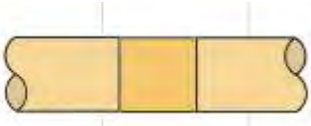
CX(I)	Defective Connection (Intruding)	Defective by intrusion or damage due to factors including: cracks, fractures, obstruction, position etc	Described by clock reference position and diameter (+ % intrusion)	
CU	Loss of Vision	Lens of camera is obscured by debris, water etc. Operator is unable to see 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	2	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

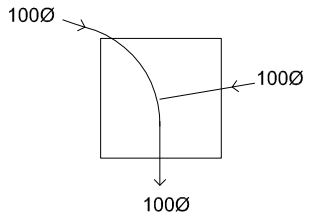
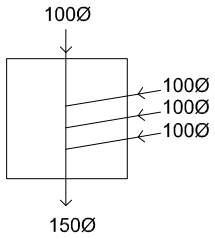
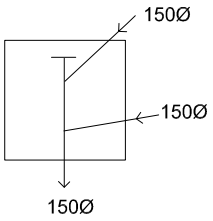
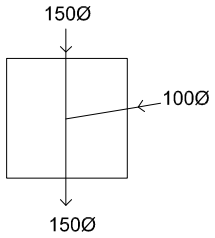
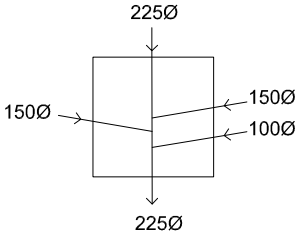
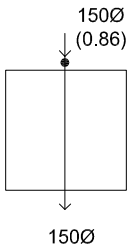
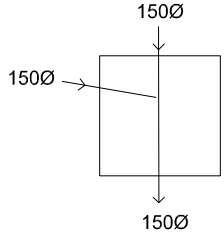
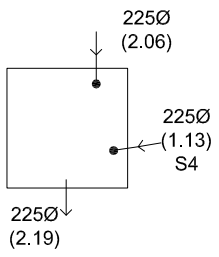
C. ANNOTATED SITE DRAWINGS

UTILITY SURVEYS LTD

5 SUFFOLK ROAD
MALDON
ESSEX
CM9 6AX

LOCATION: FORMER BUZZ BINGO BOLTON ROAD BANBURY JOB REF: 071398

CLIENT: CHURCHILL RETIREMENT LIVING DATE: 10/08/2021

MH No. F1 DEPTH. 0.87 COVER. RH CONSTRUCTION. Br REMARKS.		MH No. S2 DEPTH. COVER. CONSTRUCTION. REMARKS.	AUDIBLE TRACE TO INTERCEPTOR
MH No. F2 DEPTH. 0.61 COVER. RH CONSTRUCTION. Br REMARKS.		MH No. S3 DEPTH. 0.72 COVER. RH CONSTRUCTION. Br REMARKS.	
MH No. F3 DEPTH. 0.81 COVER. SH CONSTRUCTION. Br REMARKS.		MH No. S4 DEPTH. 1.28 COVER. RH CONSTRUCTION.Br REMARKS.	
MH No. F4 DEPTH. 3.42 COVER. RH CONSTRUCTION. Br REMARKS.		MH No. S5 DEPTH. COVER. CONSTRUCTION. REMARKS.	INTERNAL MANHOLE
MH No. F5 DEPTH. COVER. CONSTRUCTION. REMARKS.	UNABLE TO LIFT IN ROAD	MH No. S6 DEPTH. COVER. CONSTRUCTION. REMARKS.	INTERNAL MANHOLE
MH No. S1 DEPTH. 0.97 COVER. RH CONSTRUCTION. Br REMARKS.		MH No. S7 DEPTH. 2.22 COVER. RH CONSTRUCTION. Br REMARKS.	

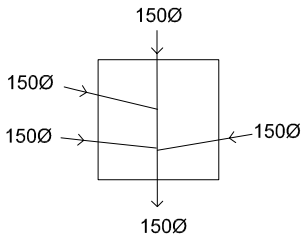
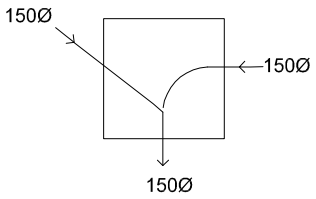
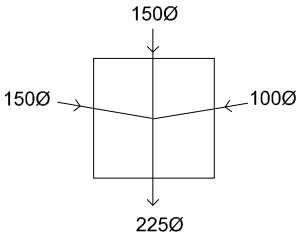
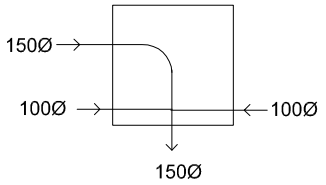
KEY:			
	C - Circular	L - Light Duty	Co - Concrete
	S - Square	M - Medium Duty	Br - Brick
	T - Triangular	H - Heavy Duty	R - Rectangular

UTILITY SURVEYS LTD

5 SUFFOLK ROAD
MALDON
ESSEX
CM9 6AX

LOCATION: FORMER BUZZ BINGO BOLTON ROAD BANBURY JOB REF: 071398

CLIENT: CHURCHILL RETIREMENT LIVING DATE: 10/08/2021

MH No. S8 DEPTH. 1.21 COVER. RH CONSTRUCTION. Br REMARKS.			
MH No. S9 DEPTH. 0.59 COVER. RH CONSTRUCTION. Br REMARKS.			
MH No. S10 DEPTH. 1.38 COVER. RH CONSTRUCTION. Br REMARKS.			
MH No. S11 DEPTH. 1.79 COVER. RM 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

CCTV Sewer Survey – Daily Record Sheet

Date	10/08/2021	Job No	071398
Client	CHURCHILL RETIREMENT LIVING		
Site Address	FORMER BUZZ BINGO		
	BOLTON ROAD		
	BANBURY OX16 0TH		
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
F1	F2	100	10-98		
F2	F3	100	24-15		
F3	FA	150	5-22		
FA	F5	150	A-10		
S1	S2	150	5-63		DEBRIS
S3	S4	150	27-01		
S4	S5	225	23-23		
S5	S6	150	22-60		
S4	S7	225	12-43		
S9	S8	150	24-87	/	ENCRUSTATION
S9	S10	150	15-09		
S10	P11	225	6-42		
S7	MAIN	225	16-29		JOINS MAIN
S11	S5	150	AS-77		
	TOTAL				

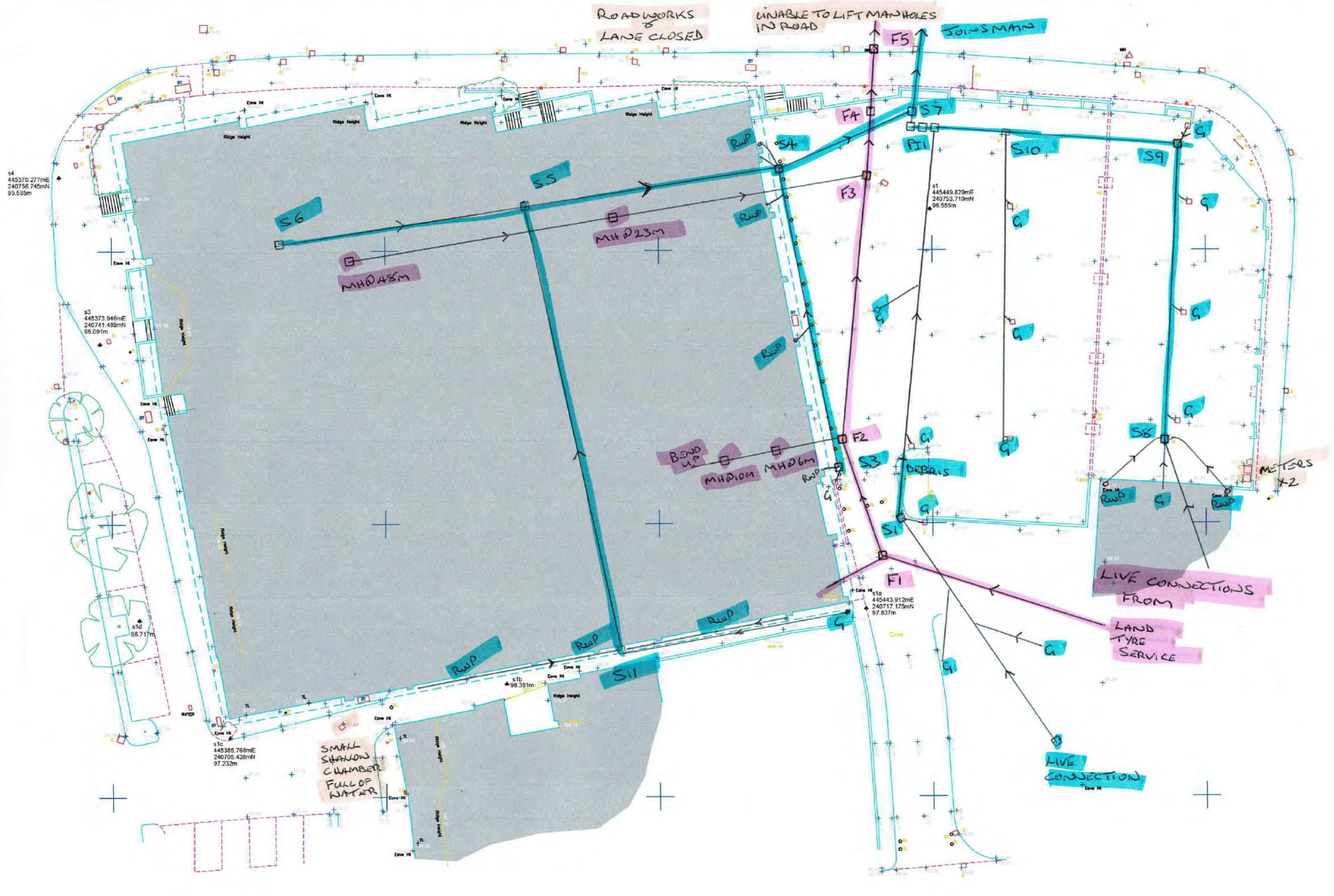
Standing Time | Meterage check: X | Length: OK

Reason for standing time

Remarks: F1 MATA LIVE CONNECTION TO LAND T/BE SERVICE
F1 MATB 100% MUD
S8-S9 50% ENCRUSTATION
S1-S2 UNABLE TO CLEAR NO ACCESS FROM DOWNSTREAM END

Special Instructions; Site Contact –

[redacted]



ROADWORKS & LANE CLOSED
UNABLE TO LIFT MANHOLES IN ROAD
JOINS MAIN
F5
F4
S7
F3
PI1
S4
S10
S9
S5
S6
MH@23M
MH@48M
s1
445449.829mE
240753.710mN
96.555m
s4
445370.277mE
240756.745mN
95.585m
s3
445373.946mE
240741.489mN
98.091m
F2
S3
BEND UP
MH@10M
MH@6M
DEBRIS
S8
METERS X2
S1
F1
LIVE CONNECTIONS FROM
LAND TYRE SERVICE
s1a
445443.912mE
240717.175mN
97.837m
S11
s1b
98.381m
s1d
98.717m
s1c
445385.768mE
240705.428mN
97.232m
SMALL SHALLOW CHAMBER FULL OF WATER
LIVE CONNECTION
RWP
G
Eave Ht
Ridge Height

Appendix E Greenfield Runoff Calculation

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Letisha Blackmore
Site name:	1260 Banbury
Site location:	Banbury, Oxfordshire

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:	52.06326° N
Longitude:	1.3391° W
Reference:	936039756
Date:	Nov 08 2021 15:47

Runoff estimation approach FEH Statistical

Site characteristics

Total site area (ha): 0.371

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.572
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.14

Hydrological characteristics	Default	Edited
SAAR (mm):	654	654
Hydrological region:	6	6
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):		0.81
1 in 1 year (l/s):		0.69
1 in 30 years (l/s):		1.86
1 in 100 year (l/s):		2.58
1 in 200 years (l/s):		3.02

Appendix F Proposed Site Plan

REVISIONS

Rev.	Date	By

Castle Street

Bolton Road

North Bar Street

Car Park

NORTH

0 5 10 15 20

scale bar - metres

s2
240785.327mN
95.182m

s4
445370.277mE
240756.745mN
95.585m

s3a
445353.456mE
240746.293mN
96.131m

s3
445373.946mE
240741.489mN
96.091m

s1d
96.717m

s1c
445385.768mE
240705.428mN
97.232m

area of public realm

metal gate

landscaping feature tbc

railings

1.2m metal railings with planting behind

1.2m metal railings with planting behind

1.2m metal railings with planting behind

1.2m metal railings atop dwarf brick wall

Trelawn House

patio

main ent.

OWNERS LOUNGE

27 residents car parking spaces (1:3 ratio)

1.8m high electric timber gates

electric pass gate

existing brick wall with new 1.8m c/b timber fence atop

1.8m timber fence

new brick-faced retaining wall with 1.2m metal railings atop

retain existing metal railing and brick wall

retain existing metal railing and brick wall

retain existing brick wall

Land Tyre Service

Access Road

Ridge Height

Parapet

Wall Ht

Eave Ht

Conc

+95.05 +95.25 +95.85 +96.00 +96.25 +96.75 +97.00 +97.10 +97.25 +97.35 +97.50 +97.74 +97.80 +98.00 +98.18 +98.35 +99.38

13 14 45

planning issues
TOWN PLANNING AND ARCHITECTURAL DESIGN
Rob Jackson RIBA
Design Director - South West
Churchill House * Parkside
Ringwood * Hampshire BH24 3SG
Telephone: (01425) 462372
Fax : (01425) 462101
E-mail design@planningissues.co.uk

Client

Churchill Retirement Living

Project Title
Proposed Retirement Housing
Bolton Road
Banbury
OX16 0TH

Drawing Title
PROPOSED SITE PLAN
PLANNING APPLICATION

Scale	1:200 @ A1	Date	DEC. 2021
Drawn	KLS	Checked	RJ
Drawing No.			Rev.

10116BB - PA01

Appendix G MicroDrainage Calculations

Summary of Results for 100 year Return Period

Half Drain Time : 230 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	98.784	0.784	0.0	5.1	5.1	69.9	O K
30 min Summer	98.993	0.993	0.0	5.1	5.1	89.8	O K
60 min Summer	99.178	1.178	0.0	5.1	5.1	106.9	O K
120 min Summer	99.259	1.259	0.0	5.1	5.1	113.0	O K
180 min Summer	99.247	1.247	0.0	5.1	5.1	112.1	O K
240 min Summer	99.207	1.207	0.0	5.1	5.1	109.1	O K
360 min Summer	99.136	1.136	0.0	5.1	5.1	103.4	O K
480 min Summer	99.078	1.078	0.0	5.1	5.1	97.9	O K
600 min Summer	99.018	1.018	0.0	5.1	5.1	92.2	O K
720 min Summer	98.954	0.954	0.0	5.1	5.1	86.1	O K
960 min Summer	98.803	0.803	0.0	5.1	5.1	71.8	O K
1440 min Summer	98.552	0.552	0.0	5.1	5.1	47.9	O K
2160 min Summer	98.341	0.341	0.0	5.1	5.1	24.1	O K
2880 min Summer	98.233	0.233	0.0	4.8	4.8	11.1	O K
4320 min Summer	98.146	0.146	0.0	4.2	4.2	1.2	O K
5760 min Summer	98.102	0.102	0.0	3.4	3.4	0.6	O K
7200 min Summer	98.087	0.087	0.0	2.8	2.8	0.4	O K
8640 min Summer	98.079	0.079	0.0	2.5	2.5	0.3	O K
10080 min Summer	98.074	0.074	0.0	2.3	2.3	0.3	O K
15 min Winter	98.881	0.881	0.0	5.1	5.1	79.2	O K
30 min Winter	99.118	1.118	0.0	5.1	5.1	101.7	O K
60 min Winter	99.375	1.375	0.0	5.1	5.1	121.8	O K
120 min Winter	99.490	1.490	0.0	5.2	5.2	130.6	O K
180 min Winter	99.499	1.499	0.0	5.2	5.2	131.3	O K
240 min Winter	99.464	1.464	0.0	5.1	5.1	128.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	108.924	0.0	74.5	18
30 min Summer	71.368	0.0	98.0	33
60 min Summer	44.757	0.0	123.3	62
120 min Summer	26.374	0.0	145.5	122
180 min Summer	19.368	0.0	160.3	180
240 min Summer	15.546	0.0	171.6	210
360 min Summer	11.371	0.0	188.4	274
480 min Summer	9.070	0.0	200.4	340
600 min Summer	7.583	0.0	209.4	410
720 min Summer	6.536	0.0	216.6	482
960 min Summer	5.142	0.0	227.2	608
1440 min Summer	3.634	0.0	240.7	852
2160 min Summer	2.551	0.0	253.2	1192
2880 min Summer	1.987	0.0	262.7	1528
4320 min Summer	1.408	0.0	278.6	2200
5760 min Summer	1.114	0.0	293.2	2872
7200 min Summer	0.942	0.0	309.5	3656
8640 min Summer	0.829	0.0	326.5	4256
10080 min Summer	0.750	0.0	344.2	5016
15 min Winter	108.924	0.0	83.6	18
30 min Winter	71.368	0.0	109.9	33
60 min Winter	44.757	0.0	138.2	62
120 min Winter	26.374	0.0	163.1	118
180 min Winter	19.368	0.0	179.7	174
240 min Winter	15.546	0.0	192.4	228

Kensington Court Woodwater Park Pynes Hill Exeter EX2 5TY	1260-Castle Street, Banbury Cellular Attenuation 100yr+40%CC
Date 09/11/2021 17:28 File 1260-SW-101-A-CELLULAR STORAGE...	Designed by Tom Checked by
XP Solutions	Source Control 2018.1

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
360 min Winter	99.361	1.361	0.0	5.1	5.1	120.8	O K
480 min Winter	99.265	1.265	0.0	5.1	5.1	113.5	O K
600 min Winter	99.161	1.161	0.0	5.1	5.1	105.6	O K
720 min Winter	99.070	1.070	0.0	5.1	5.1	97.1	O K
960 min Winter	98.858	0.858	0.0	5.1	5.1	77.0	O K
1440 min Winter	98.486	0.486	0.0	5.1	5.1	41.1	O K
2160 min Winter	98.244	0.244	0.0	4.8	4.8	12.4	O K
2880 min Winter	98.151	0.151	0.0	4.3	4.3	1.5	O K
4320 min Winter	98.093	0.093	0.0	3.1	3.1	0.5	O K
5760 min Winter	98.077	0.077	0.0	2.4	2.4	0.3	O K
7200 min Winter	98.069	0.069	0.0	2.1	2.1	0.2	O K
8640 min Winter	98.064	0.064	0.0	1.8	1.8	0.2	O K
10080 min Winter	98.060	0.060	0.0	1.7	1.7	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	11.371	0.0	211.2	286
480 min Winter	9.070	0.0	224.6	364
600 min Winter	7.583	0.0	234.8	442
720 min Winter	6.536	0.0	242.8	520
960 min Winter	5.142	0.0	254.7	666
1440 min Winter	3.634	0.0	269.8	894
2160 min Winter	2.551	0.0	283.8	1212
2880 min Winter	1.987	0.0	294.5	1476
4320 min Winter	1.408	0.0	312.5	2200
5760 min Winter	1.114	0.0	328.9	2880
7200 min Winter	0.942	0.0	347.2	3648
8640 min Winter	0.829	0.0	366.3	4296
10080 min Winter	0.750	0.0	386.3	5040

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 445419 240741 SP 45419 40741	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.371

Time (mins) From:	To:	Area (ha)
0	4	0.371

Model Details

Storage is Online Cover Level (m) 100.000

Complex Structure

Pipe

Diameter (m) 0.450 Slope (1:X) 405.000 Length (m) 60.000 Invert Level (m) 98.000

Cellular Storage

Invert Level (m) 98.150 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	99.0	0.0	1.000	99.0	0.0	1.001	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	25.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	69.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.150	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

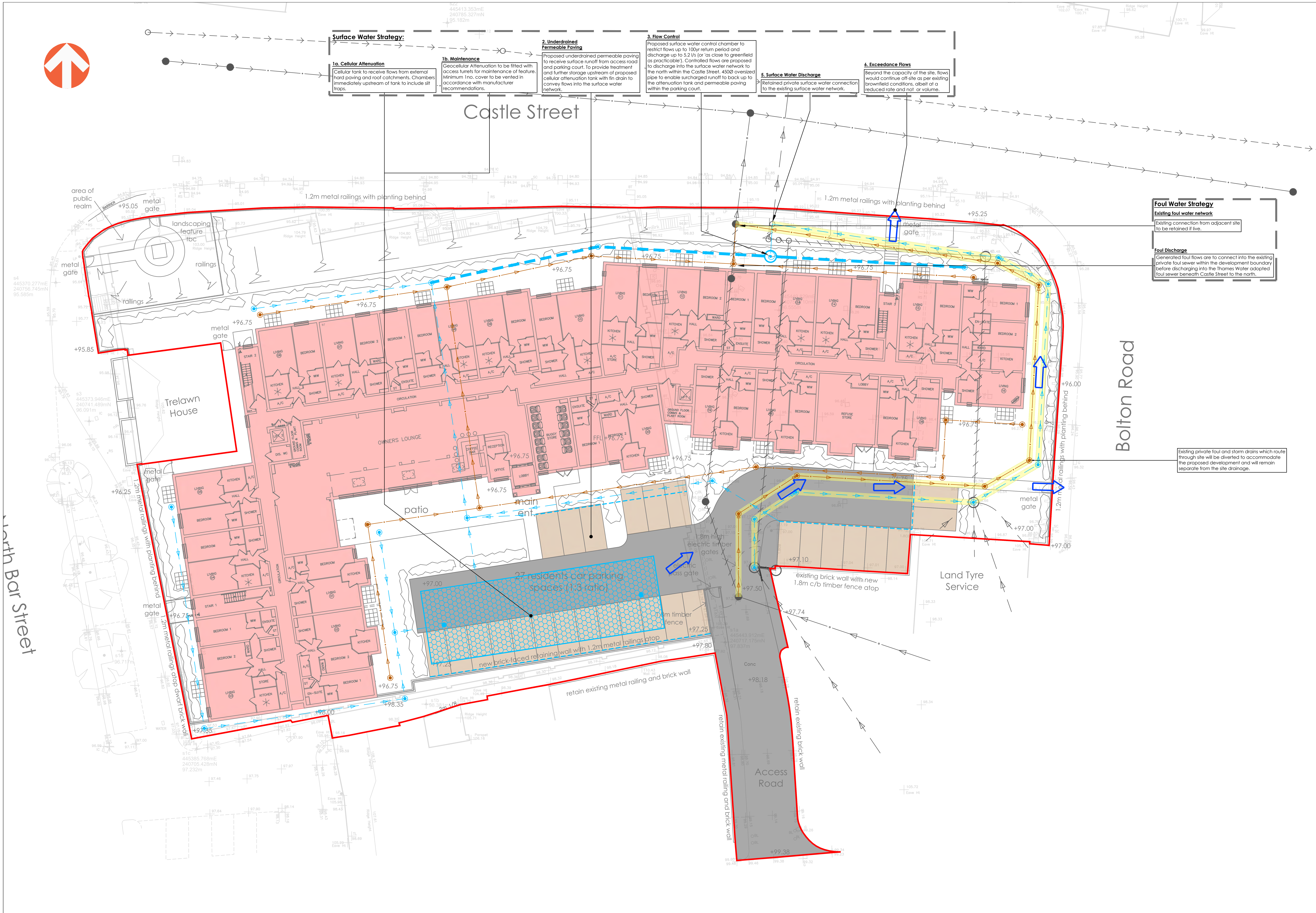
Unit Reference	MD-SHE-0100-5200-1500-5200
Design Head (m)	1.500
Design Flow (l/s)	5.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	98.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.2	Kick-Flo®	0.894	4.1
Flush-Flo™	0.439	5.1	Mean Flow over Head Range	-	4.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	0.800	4.6	2.000	5.9	4.000	8.2	7.000	10.7
0.200	4.6	1.000	4.3	2.200	6.2	4.500	8.7	7.500	11.1
0.300	5.0	1.200	4.7	2.400	6.5	5.000	9.1	8.000	11.4
0.400	5.1	1.400	5.0	2.600	6.7	5.500	9.6	8.500	11.8
0.500	5.1	1.600	5.4	3.000	7.2	6.000	10.0	9.000	12.1
0.600	5.0	1.800	5.7	3.500	7.7	6.500	10.4	9.500	12.4

Appendix H Preliminary Drainage Layout



Area Summary Schedule

Exist. Impermeable Catchment	0.487 ha
Prop. Impermeable Catchment	0.371 ha

Equivalent Brownfield rate:

Existing brownfield based on max discharge of the existing 225Ø laid at minim grade:

Brownfield Discharge Rate: 39.8 l/s

Equivalent Greenfield Runoff Rates

The greenfield runoff rates have been assessed for the net developable area using the FEH Method. The calculation excludes large areas of open space which will remain undeveloped.

Return Period	Greenfield Rate (l/s)
2yr	0.7
30yr	1.9
100yr	2.6

As far as practicable the site will seek to limit back to greenfield runoff rates based on 100mm control to avoid increased risk of blockage, as recommended by the Deign Construction Guidance.

Attenuation Summary

GeoCellular Storage Tank

Catchment	0.371 ha
Hydraulic Control	Hydrobrake @IL+0.000m Ref: MD-SHE-100-5200-1500-5200
Cellular storage Porosity	95%
Cellular storage Dimensions	4.5m x 22.0m x 1.0m deep
Over Sized Pipe Dimensions	450Ø X 60m
Porous Paving Porosity	30%
Porous Paving Dimensions	250m^2 x 0.5m deep
100yr+40% Volume Required:	**131.3 m^3**
100yr+40% Discharge Rate:	**5.2 l/s (87% betterment over existing brownfield 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 development is located within Flood Zone 1 and is not known to be susceptible to flooding from pluvial, groundwater, infrastructure or artificial sources.
3. To ensure the development is safe 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 (40%), providing betterment over existing conditions, where the rate and volume of runoff would continue to increase due to climate change.
5. The existing ground conditions preclude the use of soakaways. Instead, storm water runoff will be attenuated on-site and will discharge via the existing site connection to the TW stormwater sewer to the north of the site within Castle Street.
6. The impermeable drained catchment will reduce though the development, also reducing the peak rates and volumes of runoff from the site.
7. The attenuation requirements for the site are being delivered by a combination of cellular attenuation, oversized pipe and under-drained permeable pavements. The use of permeable pavements will offer treatment of runoff from trafficked areas prior to discharge.
8. The proposed drainage strategy for this site reduces peak flows as close to the equivalent greenfield rates as is practicable, providing significant betterment compared to existing brownfield conditions.
9. A pre-application enquiry has been issued to TW to agree to the re-use of existing sewer connections.
10. Beyond the 100-year critical storm, exceedance runoff will be directed towards any residual areas of open space and/or car parking, where any residual capacity or aboveground storage can be utilised.
11. Foul flows generated by the proposed development will be served by a new private gravity network, with new connections proposed to the TW network to suit the site layout.
12. Existing drainage connections from the commercial building to the southeast of the development (Land Tyre Service) will be retained and diverted to avoid conflict with the development. Where possible it is recommended that this is dealt with privately on-site to avoid a S185 sewer diversion application.
13. Any potential drainage connections from Trelawn House would be accommodated by the proposed development, with the ability to introduce a high-level weir within the stormwater network to assist in managing any additional inflows from Trewlawn House roof catchment.
14. 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.
15. 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.

Key

Site Boundary

Existing Utilities
- Adopted Foul Water Sewer
- Private Surface Water Sewer
- Private Foul Water Sewer
- Existing Abandoned Drain
- Existing Surface Water Sewer

Existing Foul Water Sewer

Proposed Drainage
- Impermeable Building Catchment
- Underdrained Permeable Paving
- Impermeable Car Parking Catchment
- Cellular Storage Tank
- Private Surface Water Sewer
- Diverted Sewer
- Fin Drain
- Ø450 Surface Water Sewer
- Private Surface Water Inspection Chamber
- Flow Control
- Private Foul Inspection Chamber
- Overland Exceedance

REV	DATE	DESCRIPTION	BY	CHK	APD
B	07.12.2021	UPDATED TO SUIT NEW LAYOUT	RF	LB	CY
A	15.11.2021	INITIAL ISSUE	RF	LB	CY

CLIENT: CHURCHILL RETIREMENT LIVING

DRAWING STATUS: PLANNING APPLICATION

PROJECT: CASTLE STREET, BANBURY

TITLE: PRELIMINARY DRAINAGE LAYOUT

PROJECT No: 1260 | DRAWING No: 01-PDL-1001 | REV: B

SCALE @ A1: 0 1:200 10 metres

DESIGN BY:

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