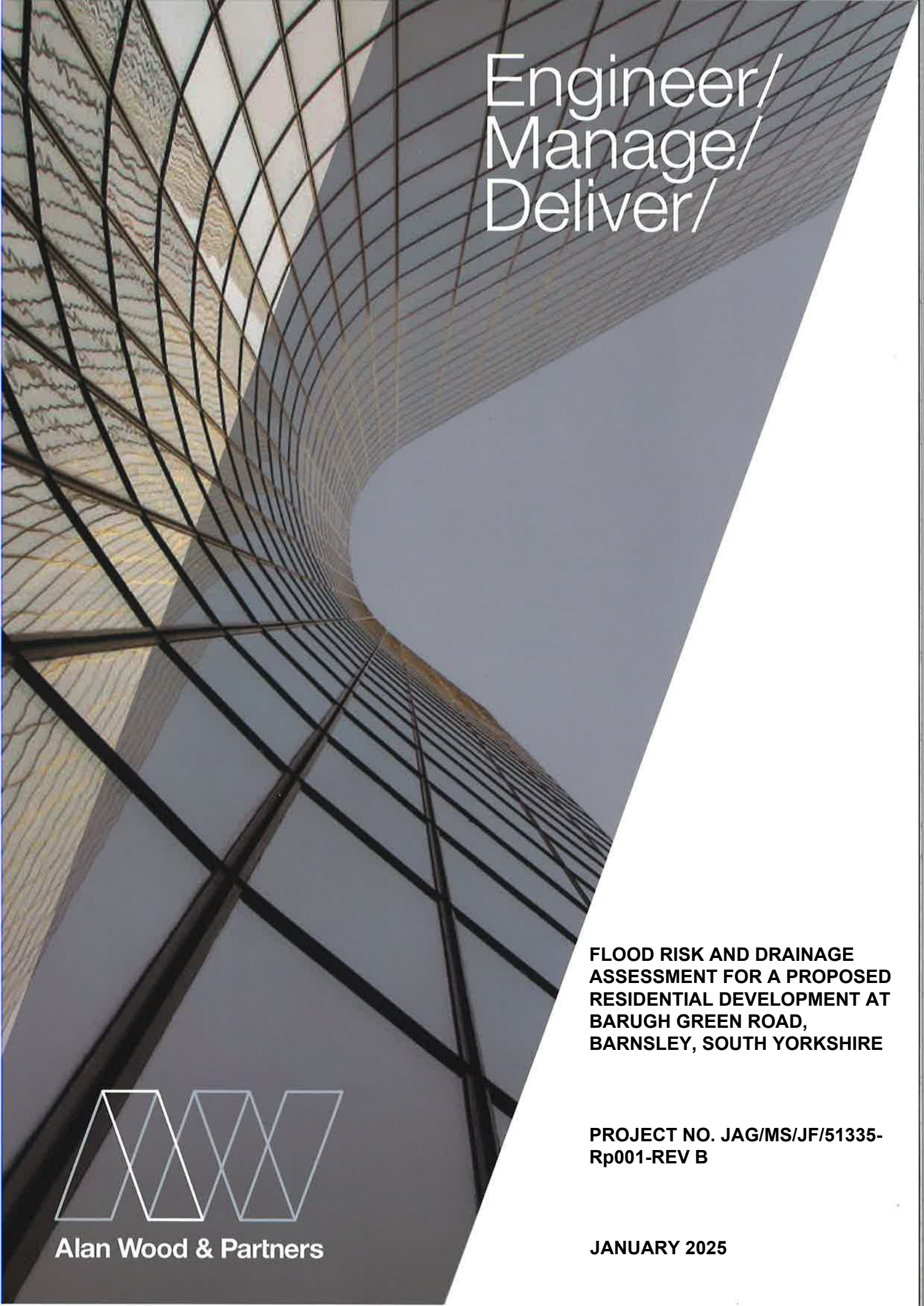




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**FLOOD RISK AND DRAINAGE
ASSESSMENT FOR A PROPOSED
RESIDENTIAL DEVELOPMENT AT
BARUGH GREEN ROAD,
BARNLEY, SOUTH YORKSHIRE**

**PROJECT NO. JAG/MS/JF/51335-
Rp001-REV B**



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RESIDENTIAL DEVELOPMENT AT BARUGH GREEN ROAD, BARNSELY,
SOUTH YORKSHIRE**

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Signed:

Date: 6th December 2024

Approved by: J Gibson, MEng (Hons), CEng, CWEM MCIWEM
Civil Engineering Director



Signed:

Date: 6th December 2024

Issue	Revision	Revised by	Approved by	Revised Date
A	Updated as per Latest Layout	CM	JAG	07.01.25
B	Updated as per Latest Layout	SC	JAG	16.01.25

For the avoidance of doubt, the parties confirm that these conditions of engagement shall not and the parties do not intend that these conditions of engagement shall confer on any party any rights to enforce any term of this Agreement pursuant of the Contracts (Rights of third Parties) Act 1999.

The Appointment of Alan Wood & Partners shall be governed by and construed in all respects in accordance with the laws of England & Wales and each party submits to the exclusive jurisdiction of the Courts of England & Wales.

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1.0 **INTRODUCTION**

1.1 **Background**

- 1.1.1 Alan Wood & Partners were commissioned by Avant Home Yorkshire to prepare a Flood Risk and Drainage Assessment for a proposed residential development on land at to the south of Barugh Green Road, Barnsley, South Yorkshire in support of an application for full planning consent.
- 1.1.2 A Flood Risk and Drainage Assessment (FRDA) for the proposed development is required to assess the development's risk from flooding and the suitability of the site in terms of drainage.

1.2 **Layout of Report**

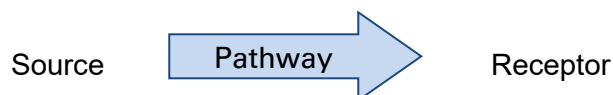
- 1.2.1 Section 1 provides an introduction to the FRDA, explains the layout of this FRDA and provides an introduction to flood risk and the latest guidance on development and flood risk in England.
- 1.2.2 Section 2 provides an introduction to the site. The site description is based upon a desktop study and information provided by the developer. In order to obtain further information on flood risk, consultation was undertaken with the Environment Agency.
- 1.2.3 Section 3 of this report details the information gathered through the consultation.
- 1.2.4 Section 4 of this report details the development proposals and considers the development proposals in relation to the current planning policy on development and flood risk in England (and what type of development is considered appropriate in different flood risk zones). National Planning Policy Framework (NPPF): and its associated Technical Guidance (Communities and Local Government, March 2012) is the current planning policy on flood risk in England, and an introduction to NPPF is provided below.
- 1.2.5 Section 5 considers the foul water drainage arrangements for the proposed development.

- 1.2.6 Section 6 considers the surface water drainage arrangements for the proposed development.
- 1.2.7 Section 7 of this report considers the flood risk to site, and the potential for the development proposals to impact on flood risk. The assessment of flood risk is based on the latest planning policy and utilises all the information gathered in the preparation of the report.
- 1.2.8 Section 8 of this report provides details of any recommendations for further work to mitigate against possible flooding.
- 1.2.9 Section 9 of this report provides a summary of the report.

1.3 Flood Risk

- 1.3.1 Flood risk takes account of both the probability and the consequences of flooding.
- 1.3.2 Flood risk = probability of flooding x consequences of flooding
- 1.3.3 Probability is usually interpreted in terms of the return period, e.g. 1 in 100 and 1 in 200-year event, etc. In terms of probability, there is a 1 in 100 (1%) chance of one or more 1 in 100-year floods occurring in a given year. The consequence of flooding depends on how vulnerable a receptor is to be flooded.

The components of flood risk can be considered using a source-pathway-receptor model.



- 1.3.4 Sources constitute flood hazards, which are anything with the potential to cause harm through flooding (e.g. rainfall extreme sea levels, river flows and canals). Pathways represent the mechanism by which the flood hazard would cause harm to a receptor (e.g. overtopping and failure of embankments and flood defences, inadequate drainage and inundation of floodplains). Receptors comprise the people, property, infrastructure and ecosystems that could potentially be affected should a flood occur.

1.4 National Planning Policy Framework

1.4.1 General

1.4.1.1 NPPF and its associated Technical Guidance replaces Planning Policy Statement 25 and provides guidance on how to evaluate sites with respect to flood risk.

1.4.1.2 A summary of the requirements of NPPF is provided below.

1.4.2 Sources of Flooding

1.4.2.1 NPPF requires an assessment to flood risk to consider all forms of flooding and lists six forms of flooding that should be considered as part of a flood risk assessment. These forms of flooding are listed in Table 1, along with an explanation of each form of flooding.

Table 1: Forms of flooding.

Flooding from Rivers (Fluvial Flooding)
Watercourses flood when the amount of water in them exceeds the flow capacity of the river channel. Flooding can either develop gradually or rapidly, depending on the characteristics of the catchment. Land use, topography and the development can have a strong influence on flooding from rivers.
Flooding from the Sea (Tidal Flooding)
Flooding to low-lying land from the sea and tidal estuaries is caused by storm surges and high tides. Where tidal defences exist, they can be overtopped or breached during a severe storm, which may be more likely with climate change.
Flooding from Land (Pluvial Flooding)
Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding. In developed areas this flood water can be polluted with domestic sewage where foul sewers surcharge and overflow. Local topography and built form can have a strong influence on the direction and depth of flow. The design of development down to a micro-level can influence or exacerbate this. Overland flow paths should be taken into account in spatial planning for urban developments. Flooding can be exacerbated if development increases the percentage of impervious area.

Flooding from Groundwater
Groundwater flooding occurs when groundwater levels rise above ground levels (i.e. groundwater issues). Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). Chalk is the most extensive source of groundwater flooding.
Flooding from Sewers
In urban areas, rainwater is frequently drained into sewers. Flooding can occur when sewers are overwhelmed by heavy rainfall, and become blocked. Sewer flooding continues until the water drains away.
Flooding from Other Artificial Sources (i.e. reservoirs, canals, lakes and ponds)
Non-natural or artificial sources of flooding can include reservoirs, canals and lakes. Reservoir or canal flooding may occur as a result of the facility being overwhelmed and /or as a result of dam or bank failure.

1.4.3 Flood Zones

- 1.4.3.1 For river and sea flooding, NPPF uses four Flood Zones to characterise flood risk. These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences, and are detailed in Table 2.

Table 2: Flood zones.

Flood Zone	Definition
1	Low probability (less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1%).
2	Medium probability (between 1 in 100 and 1 in 1,000 annual probability of river flooding (1%-0.1%) or between 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5%-0.1%) in any year).
3a	High probability (1 in 100 or greater annual probability of river flooding (>1%) in any year or 1 in 200 or greater annual probability of sea flooding (>0.5%) in any given year).
3b	This zone comprises land where water has to flow or be stored in times flood. Land which would flood with an annual probability of 1 in 20 (5%), or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain.

1.4.4 Vulnerability

1.4.4.1 NPPF classifies the vulnerability of developments to flooding into five categories. These categories are detailed in Table 3.

Table 3: Flood risk vulnerability classification.

Flood Risk Vulnerability Classification	Examples of Development Types
Essential Infrastructure	- Essential utility infrastructure including electricity generating power stations and grid and primary substations - Wind turbines
Highly Vulnerable	- Police stations, ambulance stations, fire stations, command centres and telecommunications installations required to be operational during flooding. - Emergency dispersal points. - Basement dwellings. - Caravans, mobile homes and park homes intended for permanent residential use.
More Vulnerable	- Hospitals. - Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. - Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. - Non-residential uses for health services, nurseries and educational establishments. - Sites used for holiday or short-let caravans and camping.
Less Vulnerable	- Building used for shops, financial, professional and other services, restaurants and cafes, hot foot takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable" and assembly and leisure. - Land and buildings used for agriculture and forestry.
Water Compatible	- Docks, marinas and wharves. - Water based recreation (excluding sleeping accommodation). - Lifeguard and coastguard stations. - Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.

1.4.4.2 Based on the vulnerability of a development, NPPF states within what Flood Zones(s) the development is appropriate. The flood risk vulnerability and Flood Zone 'compatibility' of developments is summarised in Table 4.

Table 4: Flood risk vulnerability and flood zone compatibility.

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test	✓	✓
	3a	Exception Test	✓	x	Exception Test	✓
	3b	Exception Test	✓	x	x	x

1.4.5 The Sequential Test, Exception Test and Sequential Approach

1.4.5.1 The Sequential Test is a risk-based test that should be applied at all stages of development and aims to steer new development to areas with the lowest probability of flooding (Zone 1). This is applied by the Local Planning Authority by means of a Strategic Flood Assessment (SFRA).

1.4.5.2 The SFRA and NPPF may require the Exception Test to be applied to certain forms of new development. The test considers the vulnerability of the new development to flood risk and, to be passed, must demonstrate that:

- There are sustainability benefits that outweigh the flood risk and;
- The new development is safe and does not increase flood risk elsewhere.

1.4.5.3 The Sequential Approach is also a risk-based approach to development. In a development site located in several Flood Zones or with other flood risk, the sequential approach directs the most vulnerable types of development towards areas of least risk within the site.

1.4.6 Climate Change

1.4.6.1 This is a planning requirement to account for climate change in the proposed design. The recommended allowances should be based on the most relevant guidance from the Environment Agency and the Lead Local Flood Authority.

1.4.7 Sustainable Drainage

- 1.4.7.1 The key planning objectives in NPPF are to appraise, manage and where possible, reduce flood risk. Sustainable Drainage Systems (SuDS) provide an effective way of achieving some of these objectives, and NPPF and Part H of the Building Regulations 2015 direct developers towards the use of SuDS wherever possible.
- 1.4.7.2 The surface water drainage has been designed in accordance with current CIRIA C753 SuDS Manual guidelines.

2.0 EXSITING SITE DESCRIPTION

2.1 Location

- 2.1.1 The development site occupies land to the south of Barugh Green Road on the northwestern outskirts of Barnsley, South Yorkshire.
- 2.1.2 The Ordnance Survey grid reference for the centre of the site development is approximately 431806, 407843.
- 2.1.3 An aerial photograph and layout plan are included in Figures 1 and 2 below, which identify the location and layout of the development.



Figure 1: Aerial Overview of the proposed development boundary and regional location.



Figure 2: Site Layout Plan.

2.2 Site Description

- 2.2.1 The area of the development currently comprises agricultural land, extending to approximately 4.82 hectares.

2.5 Surrounding Features

- 2.3.1 Barugh Green Road bounds the site to the north, beyond which lie a number of light industrial and retail units.
- 2.3.2 To the east of the development site lies an existing residential development, with Claycliffe Avenue adjoining the site in the north.
- 2.3.3 To the south of the site is agricultural land extending southwards to the M1 Motorway.
- 2.3.4 To the west are agricultural fields extending to a large residential area of Barugh Green.

- 2.3.5 An existing horticultural nursery adjoins the northwestern corner of the site.
- 2.3.6 There is an open watercourse (Cawthorne Dike) situated approximately 1km to the northwest of the development site, which enters the River Dearne 1km to the north of the site.
- 2.3.7 There are open ponds located approximately 3km to the east and approximately 1km to the northeast of the site.

2.4 Topography

- 2.4.1 A topographic survey of the development site has been undertaken, which shows that the existing ground levels vary from approximately 78.87m to approximately 87.63m OD(N) across the site.
- 2.4.2 Existing carriageway levels on Barugh Green Road fronting the site are shown to vary from approximately 78.85m to approximately 81.53m OD(N).
- 2.4.3 Existing carriageway levels on Claycliffe Avenue adjoining the site are shown to vary from approximately 79.10m to approximately 80.51m OD(N).
- 2.4.4 A copy of the topographic survey drawing is included in Appendix A.

2.5 Ground Conditions

- 2.5.1 Ground investigation works have been carried out in relation to the proposed development.
- 2.5.2 The site lies on the footprint of a former opencast mine which has been backfilled to a significant depth.
- 2.5.3 An Exploratory Site Investigation was undertaken by Lithos Consulting (Job No 3407) whereby 7 trial pits and 3 trial trenches were excavated. A high-water table level was observed in these excavations indicating possible perched water table not conducive to a soakaway solution.
- 2.5.4 A desktop study of the British Geological Survey map reveals the local geology comprises bedrock of Pennine Middle Coal Measures Formation – Mudstone, Siltstone and Sandstone with no superficial deposits.

-
- 2.5.5 A study of the groundwater maps show that the site overlays a Secondary A Aquifer, with the Groundwater Vulnerability classified as 'Medium'.
- 2.5.6 Local borehole records in the vicinity of the development show there is a shallow depth of sandy clay directly overlaying shale/mudstone.
- 2.5.7 On this basis, the local ground conditions are therefore considered to be unsuitable for soakaways/infiltration methods to be used as a means for disposal of the surface water run-off from the development.

3.0 CONSULTATION

- 3.1 The developer has been consulted in order to obtain relevant information pertaining to the proposed development.
- 3.2 Barnsley Metropolitan Borough Council have been consulted in respect of the disposal of surface water run-off from the development and the use of SuDS techniques, details of which are incorporated within this report.
- 3.3 Yorkshire Water (YWS) have been consulted in respect of the disposal of the disposal of foul wastewater from the development. We are currently awaiting their pre-planning response.
- 3.4 Previous correspondence indicated it was acceptable to discharge foul water into the combined sewer to the north in Barugh Green Road, a copy of this correspondence can be found in Appendix B.
- 3.5 Formal application will need to be made to the LLFA for approval of surface water into the watercourse that lies directly north of the site.
- 3.6 The Environment Agency have been consulted in respect of flood mapping, details of which are incorporated within this report.

4.0 **PROPOSED DEVELOPMENT**

4.1 **The Development**

4.1.1 The proposed development comprises the construction of a new residential development to include the following:-

- The construction of approximately 155 residential dwellings.
- Residential gardens.
- The construction of a new site access road with enlarged access onto Barugh Green Road.
- Car parking areas.
- Areas of public open space.
- New service supplies.

4.1.2 A copy of the indicative site layout drawing of the proposed development is included in Appendix C.

4.2 **Flood Risk**

4.2.1 In terms of flood risk vulnerability, the construction of residential development is classed as 'More Vulnerable' development in terms of flood risk vulnerability (Table 3).

4.2.2 In terms of flood zone compatibility, 'More Vulnerable' development is considered to be 'appropriate' in Flood Zone 1 (Table 4).

5.0 **FOUL WATER DRAINAGE**

5.1 **Design Criteria**

- 5.1.1 Based upon a development of approximately 155 dwellings and with an average flow rate of 4000 litres per dwelling per day, in accordance with Sewers for Adoption 7th Edition (Clause B5.1), the peak foul water flow from the development site would be approximately 8 l/s.
- 5.1.2 A separate foul sewer network will be designed and built to meet Building Regulations (private) and Sewers for Adoption (public) standards.
- 5.1.3 At this stage of the development, it is assumed that a gravity connection to the public sewer can be achieved.
- 5.1.4 It is envisaged that foul sewer pipe sizes will be 150mm in diameter with gradients not exceeding the design and manufacturers specification.
- 5.1.5 An indicative foul water drainage arrangement is shown on the Drainage Layout drawing included in Appendix D.

5.2 **Run-off Destination**

- 5.2.1 It is proposed that foul water domestic waste from the development will be discharged to the public sewer network, for which formal approval will be required from Yorkshire Water Services.
- 5.2.2 Yorkshire Water have been consulted in respect of this proposal; however, we are awaiting a formal response at this time. Previous YW enquiries advised that foul wastewater run-off from the development should discharge to the existing 600mm diameter public combined sewer recorded in Barugh Green Road at a point to the north of the site, therefore under the same basis discharge is proposed via the same means. A copy of the previous Pre-Planning Enquiry response is included within Appendix B.
- 5.2.3 A formal section 106 agreement will be required for the connection into the public sewer.

6.0 **SURFACE WATER DRAINAGE**

6.1 **General**

- 6.1.1 The surface water drainage has been designed in accordance with current CIRIA C753 SuDS Manual guidelines.

6.2 **Existing Site**

- 6.2.1 From the aerial photograph included in Figure 1 above, it can be seen that the development area currently comprises an area of agricultural land.

6.3 **Run-off Destination**

- 6.3.1 Requirement H3 of the Building Regulations establishes a preferred hierarchy for disposal of surface water disposal. Consideration should firstly be given to soakaway, infiltration, watercourse, surface water sewer and combined sewer in that priority order.
- 6.3.2 Ground investigations have shown that the underlying strata is not suitable for soakaways/infiltration trenches to be used due to the extensive depth of made and perched ground over the site.
- 6.3.3 The second preferred option would be to discharge the surface water run-off from the development to a watercourse.
- 6.3.4 Investigations have revealed that there is an open watercourse located along the northern boundary of the development into which the surface water run-off from the development could be discharged. This watercourse then discharges North from the site via a 600mm pipe into an existing SW sewer, specifically SWMH04 – as identified in the existing drainage CCTV survey (Appendix I).
- 6.3.5 It is therefore proposed that the surface water run-off from the new development is discharged into this watercourse. However, due to the relative shallow depth of the watercourse in relation to the surrounding existing ground levels, connection into a new manhole adjacent to the watercourse will be required.

- 6.3.6 This connection will discharge from a new concrete headwall sited on the Northern bank of a new attenuation lagoon which will service the proposed site due to peak-flow calculation requirements. This will be connected into a new flow-control manhole with a discharge rate of 16.6l/s (see next section) before finally discharging into the existing manhole SWMH04. This proposal will allow the existing connection from the watercourse into existing manhole SWMH04 to remain in place
- 6.3.7 The drainage ditch is shown to lie under the jurisdiction of the LLFA and consequently formal permission will need to be applied for and granted before discharge can be allowed, even when proposing a new connection into the existing manhole SWMH04.
- 6.3.8 Alternatively, a new surface water connection can be made directly into SWMH04 from the concrete headwall, inclusive of a the same flow control manhole as described in paragraph 6.3.6. A new secondary manhole would then be constructed downstream of the flow-control manhole that would include a backdrop connection from the existing watercourse before ultimately discharging in the existing SWMH04 via a new connection. If this alternative method was constructed, the existing watercourse to SWMH04 connection could be abandoned.
- 6.3.9 The proposed solutions would avoid the requirement for an adoptable pumping station and the inherent servicing and power requirements and negative environmental factors associated.

6.4 Flood Risk

- 6.4.1 For new developments the current design criteria required for the surface water drainage will need to be based upon the critical 1 in 100-year storm event, with an additional allowance to account for climate change resulting from global warming. There should be no above ground flooding for the 1 in 30-year return period and with no flooding to the development or off-site flooding affecting other parties from the critical 1 in 100-year storm event, with an additional allowance to account for climate change.

6.5 Climate Change

- 6.5.1 An additional allowance of 40% to account for climate change has been included in the design of the surface water drainage network in accordance with Barnsley Metropolitan Borough Council SuDS guidelines.

6.6 Urban Creep

- 6.6.1 The project involves the construction of a residential development and consequently and as such an additional 10% has been accounted in the modelling to mitigate against future urban creep.

6.7 Peak Flow Control

- 6.7.1 We have calculated the impermeable area of the proposed development to be approximately 2.490 hectares based upon the appended layout drawing.
- 6.7.2 The remaining site area of approximately 2.330Ha will remain permeable in the form of landscaping which will not require any positive drainage and will consequently discharge at greenfield run-off.
- 6.7.3 The uncontrolled surface water run-off from the new development could be approximately 294l/s, based on BS EN 752 calculations, using a rainfall intensity of 50mm/hour.
- 6.7.4 However, new developments are not permitted to discharge at an unrestricted rate and are normally limited to a “greenfield” discharge rate, which in this region has been determined at 28l/s, based upon the ICP SUDS calculated run-off rate.
- 6.7.5 A copy of the greenfield runoff rate calculation sheet is shown in Appendix E.
- 6.7.6 The impermeable area for design purposes will be 2.490Ha, the proposed discharge for the development has been reduced from the greenfield discharge rate to 16.6l/s which provides a real-world betterment of approximately 42%.
- 6.7.7 Formal permission will need to be sought from the LLFA to determine if this discharge rate is acceptable.

- 6.7.8 In order to ensure the discharge of surface water from the development will not increase the risk of flooding to other properties, it will be necessary to attenuate the drainage by restricting the discharge to the agreed rate and providing storage as required.
- 6.7.9 The design will need to be based upon the critical 100-year storm event with the required additional allowance of 40% for climate change, plus an additional 10% for urban creep.
- 6.7.10 Based upon the above design criteria storage, a hydraulic model study has been undertaken in order to assess the pipe sizes and gradients and the likely storage volumes required.
- 6.7.11 The results of this analysis are shown in Appendix F.
- 6.7.12 A summary of the storage volumes required is set out in Table 5 below.

Table 5: Volume of water storage required.

Storm Event	1 in 1 Probability Storm Event	1 in 30 Probability Storm Event	1 in 100 Probability Storm Event + 40%
Storage Volume Required Basin 01	278m ³	762m ³	1429m ³
Storage Volume Required Basin 02	68m ³	100m ³	358m ³

- 6.7.13 The calculated storage volumes set out above will be subject to detailed design and approval.
- 6.7.14 The drainage system must contain the storage volume for the 1-year storm event below ground within the drainage system with no surcharging of manholes in order to prevent flooding.
- 6.7.15 The drainage system must also contain the storage volume for the 30-year storm event below ground within the drainage system.
- 6.7.16 The additional storage required to accommodate the 100-year storm event plus 50% climate change can be stored above ground provided it is retained on site such that it cannot flood other developments beyond the site.

6.7.17 Alternatively, it can be stored below ground within an adoptable storage tank which would form part of the Section 104 Agreement with the Water Authority.

6.7.18 Drawings detailing the proposed drainage strategy are included within Appendix C, showing pipe sizes varying from 225mm to 600mm in diameter with gradients not exceeding design and manufacturers specifications.

6.8 Volume Control

6.8.1 SuDS guidelines advise that the run-off volume from the development site for the 1 in 100 year 6-hour rainfall event should not exceed the greenfield run-off volume for the same event.

6.8.2 The discharge rate has been based upon the greenfield run-off rate with an approximate 42% betterment and consequently this requirement has been satisfied.

6.9 Pollution Control

6.9.1 It is a requirement to ensure that the quality of any receiving body is not adversely affected by the development.

6.9.2 Investigations have revealed that the development site Overlays a Secondary A Aquifer, with the Groundwater Vulnerability classed as 'Medium'.

6.9.3 In order to minimise the risk of pollution to the watercourse, clean roof water drainage should discharge directly into the sealed drainage network (i.e. not via gullies) and will then be stored below ground prior to discharge to the watercourse.

6.9.4 Silt traps should be provided on the outlets from any gullies or drainage channels, which should be maintained in accordance with Section 6.13 of this report.

6.9.5 On this basis, it is considered that the risk of pollution to the final receiving sewer/watercourse has been adequately addressed.

6.10 Water Quality

- 6.10.1 The water quality from the development via the surface water drainage system has been assessed in accordance with the simple index approach set out in Chapter 26 of the CIRIA SuDS Manual C753.
- 6.10.2 The output shows that the water quality from the roof, road and parking areas will be of a suitable quality.
- 6.10.3 Copies of the matrix outputs from the assessment are included in Appendix G.

6.11 Designing for Exceedance

- 6.11.1 Overland flood risk from exceedance flows and from off-site sources will be mitigated to a large extent by the creation of the new surface water sewerage system as described above. Where possible proposed ground levels will be set to channel flows away from the proposed building. Furthermore, the ground floor construction level for the building will be raised by a minimum of 150mm above the finished ground level in order to provide additional clearance above any likely flooding.
- 6.11.2 The existing overland flow routes should generally be maintained within the final layout of the development site without increasing the flood risk to off-site parties.
- 6.11.3 Any existing flood risk may reduce by the creation of a formal surface water drainage system but cannot be entirely removed.
- 6.11.4 Drawings showing the existing and proposed overland surface water flood routing is included in Appendix H.

6.12 Highways Drainage

- 6.12.1 Highways drainage from the proposed adoptable roads on site will be collected by trapped gullies prior to discharge into the below ground drainage network. The highway drainage will be offered for adoption to the Local Authority, via a formal Section 38 Agreement.

6.13 Operation and Maintenance

- 6.13.1 All pipework within the new drainage system is designed with self-cleansing gradients and consequently there should be little, or no maintenance required.
- 6.13.2 All road gullies or drainage channel systems serving areas of hardstanding will need to be regularly inspected to ensure the system remains operable see Table 6 below.
- 6.13.3 All inspection chambers should be regularly inspected to ensure the system is free flowing. See operation and maintenance requirements in Table 6 below.

Table 6: Operation and Maintenance Requirements for Silt Traps/Trapped Gullies (Based on CIRIA C753 Table 14.2).

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	6 monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	6 monthly
	Inspect filter media and establish appropriate replacement frequencies	6 monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every 6 months
*During the first year of operation, inspections should be carried out at least monthly (and after significant storm events) to ensure that the system is functioning as designed and that no damage is evident.		

- 6.13.4 Operation and maintenance requirements for an attenuation lagoon are set out in Table 8 below.

Table 7: Showing operation and maintenance requirements for an attenuation lagoon.

Maintenance schedule	Required action	Typical frequency*
Routine maintenance	Remove litter and debris	6 monthly
	Vegetation management	As required
Occasional maintenance	Clean inlet/outlet pipe	As required
Remedial actions	Repair/re-construct damaged	As required

	component/structure	
	Remove silt and debris	As required
	Inspect for evidence of damage or erosion	6 monthly
	Inspect sediment accumulation	Yearly
*During the first year of operation, inspections should be carried out at least monthly (and after significant storm events) to ensure that the system is functioning as designed and that no damage is evident.		

- 6.13.5 The main sewer network will be offered to YWS for formal adoption under a Section 104 Agreement and therefore YWS will be responsible for the operation, management and maintenance of the network in line with standard requirements and obligations.
- 6.13.6 The highway drainage will form part of the Section 38 Agreement with the Highway Authority who will be responsible for future maintenance works.
- 6.13.7 Operation and maintenance requirements of the drainage components, as listed above, should be undertaken in accordance with Chapter 32 of the CIRIA SuDS Manual and any relevant manufacturer's recommendations. See also BS 8582:2013 Code of Practice for Surface Water Management for Development Sites Section 11 and Susdrain Fact Sheet on SuDS Maintenance and Adoption Options (England) dated September 2015.
- 6.13.8 The personnel undertaking the maintenance should have appropriate experience of SuDS and drainage maintenance and should be capable of keeping sufficiently detailed records of any inspections. An example of a checklist for SuDS maintenance can be found within Appendix B of the CIRIA C753 SuDS Manual v2. If personnel do not have appropriate experience, then specific inspection visits may be necessary. During the first year of operations of SuDS, inspections should usually be carried out at monthly intervals (and after significant storm events).
- 6.13.9 The domestic drainage will remain the responsibility of the individual householders.

7.0 FLOOD RISK ASSESMENT

7.1 Flood Zone

- 7.1.1 A copy of the Environment Agency Flood Map for Planning is included in Figure 3 below, which identifies the development site to be located within an area designated as Flood Zone 1, (low probability of flooding), with a less than 1 in 1000 annual probability of flooding in any year.

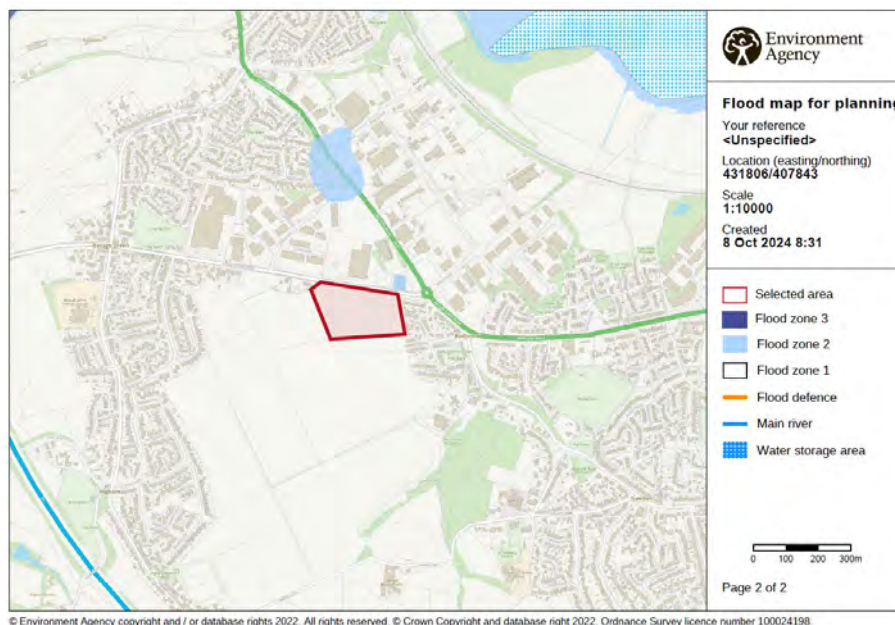


Figure 3: EA flood map for planning.

7.2 Historic Flooding

- 7.2.1 An abstract from the Environment Agency Recorded Flood Outlines dataset is shown in Figure 4. The dataset collates flood records of historic flooding from rivers, the sea, ground water and surface water since 1946. The proposed development area has not been recorded to have flooded in this time.



Figure 4: Showing EA historic flood data.

7.2.2 As can be seen in Figure 4 above, the proposed development does not show to have been susceptible to any recorded instances of historic flooding.

7.3 Fluvial Flooding

7.3.1 Figure 5 shows flood data for rivers and seas for the site and surrounding areas, with the risk broken up into different categories which are as follows:

- High – greater than 3.3% per annum
- Medium – Between 1% - 3.3% per annum
- Low – Between 0.1% and 1% per annum
- Very Low – less than 0.1% per annum

- 7.3.2 The site is located approximately 1km to the south of the River Dearne, which is the main potential source of flooding in the region.
- 7.3.3 The existing ground levels in proximity to the River Dearne are in the region of 52m OD(N), which is considerably lower than the ground levels over the area of the development site.

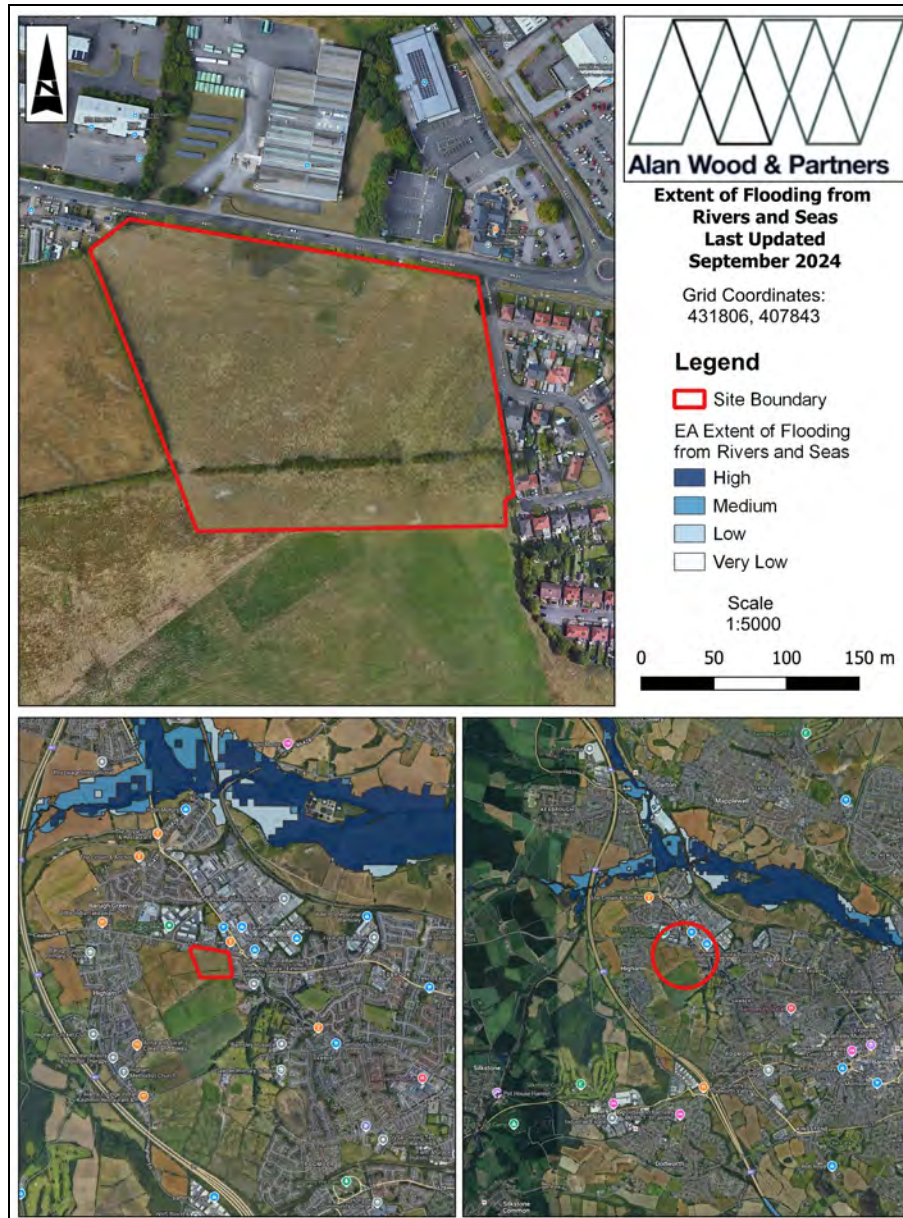


Figure 5: EA flood data for rivers and seas showing the proposed development area in relation to flood extents from this source.

- 7.3.4 The risk to the development from fluvial flooding is therefore considered to be low and acceptable.

7.4 Flooding from Open Drainage Ditches

- 7.4.1 There is an open drainage ditch located along the northern boundary of the site which drains the surface water run-off from the agricultural field.
- 7.4.2 During periods of extreme rainfall, there is the potential risk that the ditch may overtop causing localised flooding.
- 7.4.3 However, as the site levels rise towards the south across the site, any such flooding would remain localised to the ditch.
- 7.4.4 This is reflected on the surface water flooding maps included in Section 7.4 below.
- 7.4.5 The entrance road will pass over this open ditch, however, the culvert will be sized appropriately to not increase the flood risk in this area.
- 7.4.6 We therefore consider the risk of flooding from this source to be low and acceptable.

7.5 Surface Water Flooding

- 7.5.1 Figure 6 (SW Extents) shows the EA's data for Surface water flooding with the site being shown to lie within the boundary of the surface water flood extents.
- 7.5.2 Figure 6 (3.3% AEP) shows that the surface water flood depths for 3.3% AEP (1 in 30 event) with the proposed development area shown to have the northern most boundary inside of an area susceptible to flooding of up to 150mm.
- 7.5.3 Figure 6 (1% AEP) shows that the surface water flood depths for 1% AEP (1 in 100 event) and highlights that localised areas within the northern most boundary line and along the southeastern boundary fall within the area of flooding from this source with depths of up to 150mm.

7.5.4 Figure 6 (0.1% AEP) shows that the surface water flood depths for 0.1% AEP (1 in 1000 event) and highlights a flood risk of up to 300mm of flooding from this source at small areas within the far northern most edge of the development and within the Eastern part of the development. The other portions of the development that fall within the 0.1% surface water flood extent scenario show depths of up to 150mm.



Figure 6: Showing EA surface water flood extents alongside surface water flood depths for varying scenarios.

7.5.5 Based on Figure 6 above, it shows that there is a risk of up to 300mm in some isolated areas of the development under the 0.1% AEP scenario with risk of up to 150mm during the 1% and 3.3% AEP scenarios. However, the portions within the north of the development which intersect with the site boundary are likely significantly reduced due to surface water drainage systems along the roadside which the EA data does not take into account.

7.5.6 In the event of exceedance, it is predicted that water will flood out of gullies and follow a flow path to the northeast corner of the site. There will be no changes made to the boundary levels as part of the development, and as such the existing flow paths will be maintained.

7.5.7 Overland flooding will be accommodated for by raising finished floor levels and allowing water to collect at lower points within the site (designed as such).

7.5.8 As a result of the proposed development, the overall risk of surface water flooding to the site area and residential properties on the eastern boundary will be reduced by the new drainage design to an acceptable level.

7.5.9 The risk of flooding to the development from this potential flood source is therefore considered to be low and acceptable.

7.6 Flood Risk from Existing Water Mains

7.6.1 There are likely be existing water mains present within the adjacent highways and serving the adjacent development sites.

7.6.2 There are no known issues regarding the condition of any such water mains.

7.6.3 The risk of flooding to the development from this potential flood source is therefore considered to be low and acceptable.

7.7 Flood Risk from Existing Drainage Services

7.7.1 There are likely to be existing drainage services present within the adjacent highways and serving the adjacent development sites.

7.7.2 There are no known issues regarding the condition or the capacity of any such drainage services.

7.7.3 The risk of flooding to the development from this potential flood source is therefore considered to be low and acceptable.

7.8 Groundwater Flooding

7.8.1 Groundwater flooding can occur when the sub-surface water levels are high and emerges above ground level.

7.8.2 There are no proposals to create any basements within the development.

7.8.3 The proposed development will not involve deep excavation works and consequently the risk to the development from this potential flood source is considered to be low and acceptable.

7.9 Flood Risk from Reservoirs, Canals and Other Artificial Sources

7.9.1 EA reservoir flood risk data shows the extent of flooding reservoirs under varying scenarios which are broken down below:

- Dry Day – showing the extent of flooding for reservoir overtopping during a dry day and considers reservoir bank failures for all large reservoirs when rivers are at their normal levels.
- Wet Day - shows the extent of flooding for reservoir overtopping when rivers are added to the model during a wet day scenario.
- Fluvial Contribution - shows the extent of flooding for reservoir overtopping during a wet day and considers reservoir bank failures for all large reservoirs when rivers have already overflowed their banks.

7.9.2 In addition to the various reservoir flood scenarios, the EA data also break down the risk of flooding from reservoirs into 3 designations in their reservoir flood maps guidance which are determined on their risk to life which are:

- High Risk – In the unlikely event that a reservoir fails and a breach from this means occurs then it is predicted that there is a risk to life.
- Not High Risk – In the unlikely event that a reservoir fails it is predicted that there would not be a risk to life.
- Not Determined Yet – A determination has not been made yet.

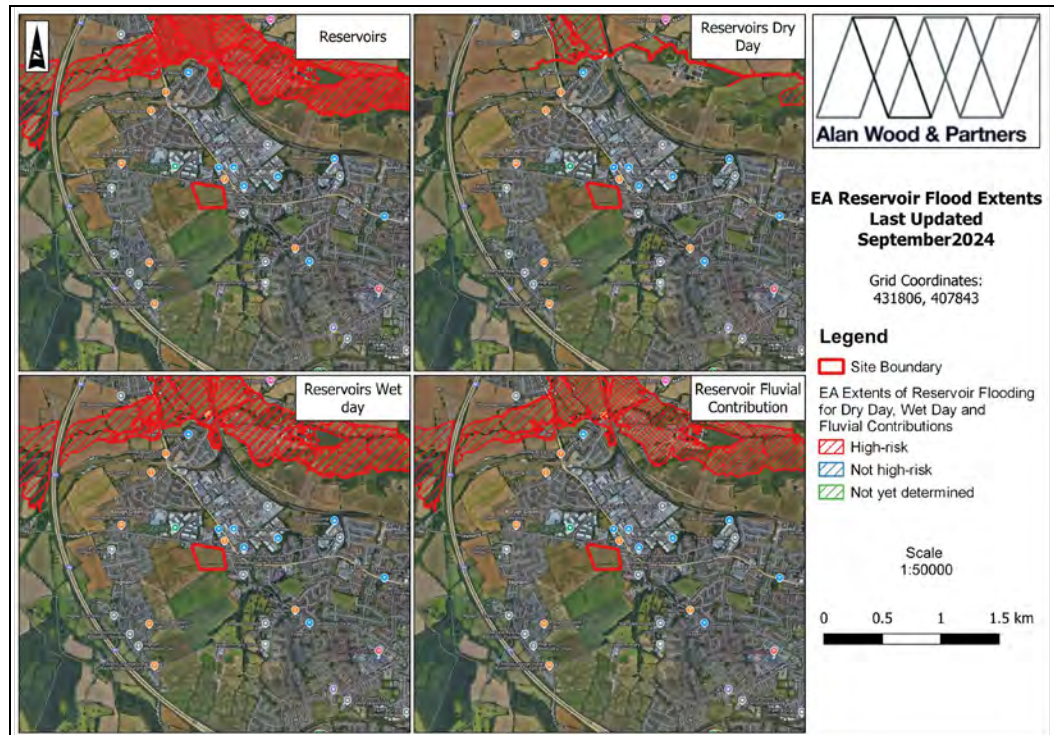


Figure 7: Showing EA flood extents for reservoirs under wet and dry days, with fluvial contributions.

- 7.9.3 As shown in Figure 7, there is no risk of flooding from reservoir flooding to the development, therefore, the requirement for mitigation against flooding from this source has been met.

8.0 FLOOD MITIGATION MEASURES

- 8.1 With the area of the new development site lying within Flood Zone 1 (low probability of flooding), there is no requirement to elevate the floor level of the buildings above traditional construction methods (normally 150mm above adjacent ground level).
- 8.2 As the development is not at risk from fluvial flooding, it is considered that there will be no requirement to incorporate any flood resilient construction measures within the design of the development.
- 8.3 Areas of the site are shown to be at minor risk from surface water flooding.
- 8.4 The finished ground levels over the full area of the development will be re-profiled to suit the new construction arrangement and any local depressions within the area of the development will be infilled. Developing the design to suit the required gradients and the introduction of the new drainage network should adequately address any localised risk of overland surface water flooding.
- 8.5 Finished external ground levels should also be designed to direct waters away from the buildings to ensure there is no localised risk of flooding to the buildings during an extreme rainfall event.
- 8.6 The surface water drainage should be designed in accordance with Section 6 of this report in order to ensure the development does not pose a risk of flooding to the new development or to other parties.
- 8.7 All approach roads to the development are shown to lie within Flood Zone 1 (low probability of flooding) and consequently safe access to and egress from the development should still be achievable should a flood situation arise.
- 8.8 The entrance road culvert over the open ditch will be sized sufficiently large enough to not become a restriction point for flooding in this area.
- 8.9 There should therefore be no requirements for evacuation of building occupants resulting from the development during an extreme flood event.
- 8.10 It is not considered that any other specific mitigation works will be required in respect of flood risk to the development.

9.0 SUMMARY

- 9.1 This report has been prepared to assess the flood risk and drainage implications for a proposed residential development to the south of Barugh Green Road, Barnsley, South Yorkshire.
- 9.2 The site falls in Flood Zone 1 (low probability of flooding) on the Environment Agency maps and the proposals are considered to be 'More Vulnerable' in terms of flood vulnerability (Table 3) which is compatible in Flood Zone 1 (Table 4).
- 9.3 No specific flood risk to the development has been identified in the preparation of this report, other than minor flood risk from overland surface water which will be addressed at the detailed design stage of the project.
- 9.4 Foul water will be discharged to the existing 600mm diameter public combined sewer recorded in Barugh Green Road at a point to the north of the site via a gravity outfall at an approximate rate of 8l/s. The sewers will be designed and constructed to meet the requirements of the Building Regulations.
- 9.5 Surface water is proposed to be discharged to the watercourse/existing sewer system on the northern boundary of the site at a discharge rate of 16.6l/s and any excess flows balanced on site. The sewers will be designed and constructed to meet the requirements of the Local Water Authority for the adoptable drainage and the requirement of the Building Regulations for the domestic drainage.
- 9.6 The report's supporting calculations and sketches provide a robust case for justifying the means of foul and surface water drainage and that the site can be suitably, safely and sustainably drained.
- 9.7 Overall, this report demonstrates that the foul and surface water drainage systems for the new development can be designed and constructed to meet local and national planning and drainage policies. Suitably worded Conditions can be applied to the grant of planning permission to control the delivery of the development in the usual manner.

APPENDIX A

Topographic Survey Drawing



Haycock+Todd

Land Survey Consultants, Architectural Surveyors

100, The Arcade, 100, Queen Street, Sheffield, S1 2HQ, England

SITE SURVEY

BARUGH GREEN ROAD

BARNSELEY

Sheet 1 of 1

Surveyed by: RT

Date: 10/01/2020

Date of Survey: February 2020

Scale: 1:2000

Survey: 200, 100, 100

S9638

Client: Barnsley Council

Project: Barugh Green Road

Drawn by: RT

Checked by: RT

Approved by: RT

Date: 10/01/2020

Scale: 1:2000

Survey: 200, 100, 100

S9638

Station	Easting	Northing	Level
1	43106.518	40780.000	76.215
2	43107.000	40780.000	76.220
3	43108.000	40780.000	76.247
4	43108.218	40781.500	76.218
5	43108.518	40781.500	76.248
6	43107.000	40780.000	76.248
7	43108.218	40780.000	80.284
8	43109.000	40780.000	80.284

APPENDIX B

Yorkshire Water Services Pre-Plan Enquiry Response

**Yorkshire Water Services
Developer Services
Pre-Development Team
PO BOX 52
Bradford
BD3 7AY**

**Alan Wood & Partners
341 Beverley Road
Hull
HU5 1LD**

Tel: 0345 120 8482

Fax:

Email:

**Your Ref:
Our Ref: A005849**

technical.sewerage@yorkshirewater.co.uk

**For telephone enquiries ring:
George Mullaney on 0345 120 8482**

17th December 2024

Dear Mr Gouldson,

**Barugh Green Road, Barugh Green, Barnsley, South Yorkshire S75 1HR – Pre-Planning
Sewerage Enquiry V713194**

Thank you for your recent enquiry. Our charge of £187.00 plus VAT will be added to your account with us, reference AWP054. You will receive an invoice for your account in due course.

Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records. The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months:

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

Foul water domestic waste can discharge to the 600 mm diameter public combined sewer recorded in Barugh Green Road, at a point to the north of the site.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2010. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

As the proposed site is currently undeveloped no surface water is known to have previously discharged to the public sewer network.

As such, the local public sewer network does not have capacity to accept any surface water from the proposed site. If SuDS are not viable, the developer is advised to contact the Environment Agency/local Land Drainage Authority/Internal Drainage Board with a view to establishing a suitable watercourse for discharge.

It is understood that a watercourse is located within the boundary of the site. This appears to be the obvious place for surface water disposal (if SuDS are not viable). Please note Yorkshire Water cannot provide plans of culverted watercourses or highway drains. To obtain plans please contact the Lead Local Flood Authority for more details.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply online or obtain an application form from our website (www.yorkshirewater.com/developers/sewerage/sewerage-connections/) or by telephoning 0345 120 84 82.

Under the provisions of section 111 of the Water Industry Act 1991 it is unlawful to pass into any public sewer (or into any drain or private sewer communicating with the public sewer network) any items likely to cause damage to the public sewer network or interfere with the free flow of its contents or affect the treatment and disposal of its contents. Amongst other things this includes fat, oil, nappies, bandages, syringes, medicines, sanitary towels and incontinence pants. Contravention of the provisions of section 111 is a criminal offence.

An off-site foul and surface water sewer may be required which may be provided by the



YorkshireWater

developer and considered for Code for Adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

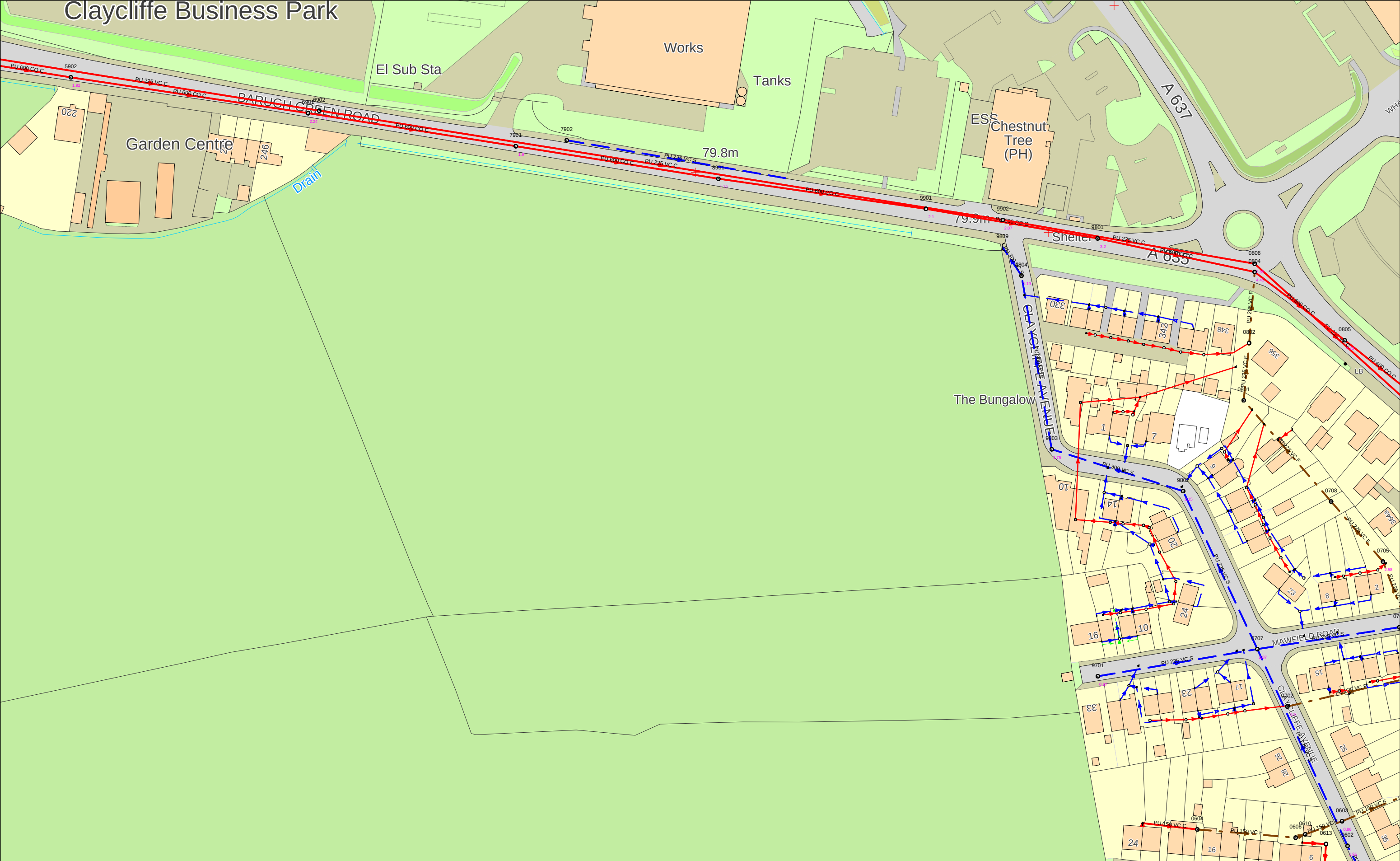
Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Code for Adoption, pursuant to an agreement under Section 104 of the Water Industry Act 1991. We are happy to offer pre-development technical advice on any prospective sites that you would like to put forward for adoption, prior to submission of your adoption application.

An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Sewer Adoption, Diversion and Requisition (telephone 0345 120 84 82) or email technical.sewerage@yorkshirewater.co.uk or visit - <https://www.yorkshirewater.com/developers/sewerage/sewer-adoptions/> for further information.

All the above comments are based upon the information and records available at the present time and are valid for a period of 12 months. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours Sincerely

George Mullaney
Town Planning Technician



	431652 : 407721	Map Name : SE3107NE	 Yorkshire Water Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : G Mullaney Contact Tel :	Title	Partial Key	This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.
				Notes		
				(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2024. All rights reserved Ordnance Survey Licence number AC0000813445		
					Date Req : 17/12/2024, 12:15:56	Date Gen : 17/12/2024, 12:16:15
	Source : Sewer Network Enquiry					

APPENDIX C

Indicative Site Layout Drawing



- PLANNING LAYOUT KEY:
- SITE BOUNDARY
 - ASSOCIATED LAND
 - ROAD
 - ROAD MARKINGS
 - DRIVES & PATHS
 - 1.8m TIMBER SCREEN FENCE
 - 1.2m POST & RAIL FENCE
 - 1.8m TIMBER GATE
 - 1.2m METAL RAILINGS
 - 0.45m KNEE HIGH RAIL
 - 1.8m SCREEN WALL & FENCE PANEL INFILL
 - 2m ACOUSTIC FENCE/SCREEN WALL
 - EASEMENT
 - VISIBILITY SPLAY
 - BIN STORAGE
 - BIN COLLECTION POINT
 - 6'x4' SECURE CYCLE/SHED
 - PLOT NUMBERS
 - PARKING SPACES
 - S106 AFFORDABLE PLOTS

- TARMAC ROAD
- BLOCK PAVING
- TARMAC PRIVATE DRIVES
- POS & FRONT GARDENS
- REAR GARDENS
- EXISTING TREES AND HEDGING
- TREES AND HEDGING TO BE REMOVED
- PROPOSED TREE PLANTING - Refer to Landscape Masterplan

Schedule of Accommodation
Barugh Green, Barnsley
02/12/2024

Affordable Housing						
Name	Sq.ft	Bed	NDSS	Storey	M4(2)	Total Sq.ft
HAT	818	2	Y	1	M43	1636
Brantley	673	1	Y	2	M43	1346
Totley	737	1	Y	2	N	1474
E2-1	821	2	Y	2.5	N	6568
B3	972	3	Y	2.5	N	13608
CH	1257	4	Y	2.5	Y	29514
Total						25,810

Open Market Housing						
Name	Sq.ft	Bed	NDSS	Storey	M4(2)	Total Sq.ft
HAT	818	2	Y	1	M43	1636
Askham	707	1	Y	2	N	9898
Eastbeck	821	2	Y	2.5	N	6210
Fennside	808	2	Y	2	N	9996
Rpley	827	2	Y	2	N	18194
Layburn	948	3	Y	2	N	8532
Baldon	972	3	Y	2.5	N	11864
Salbury	1087	3	Y	2.5	N	15218
Wentridge	1145	4	Y	2	Y	8015
Netherton	1257	4	Y	2.5	N	21369
Cookbury	1275	4	Y	2	N	3825
Thorsby	1439	4	Y	2	N	1439
Total						117,893

Overall Total	
158	143,403

Gross Area	
11.90 Acres	4.82 Hectares
Nett Area	
8.50 Acres	3.44 Hectares

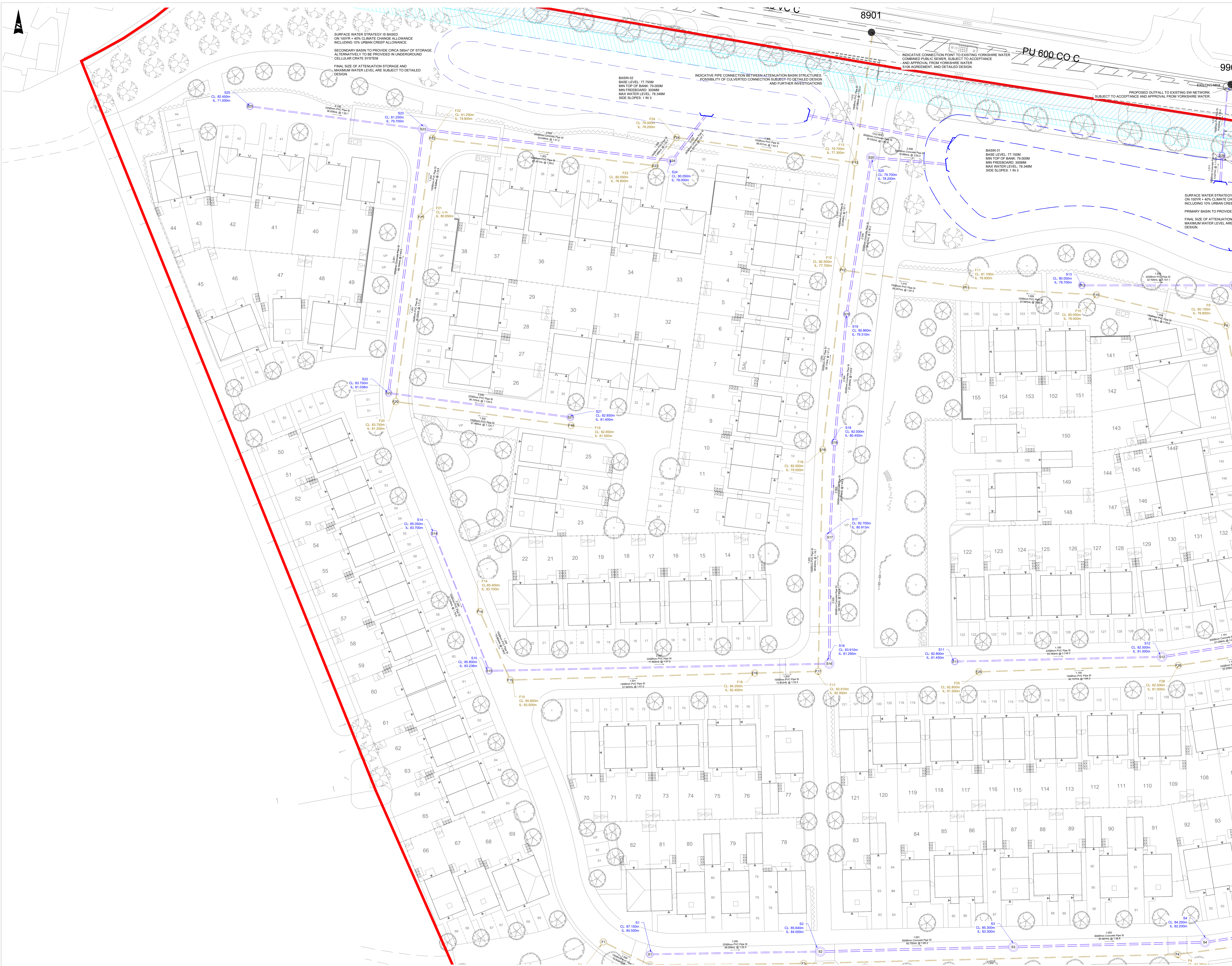
Coverage	
16,871 Sq.ft / Acre	
Less 2.5 storey	15,581 Sq.ft / Acre
Density	18 Units per Acre
Average Size OM	943 Sq.ft
Average Size Total	925 Sq.ft

Sq.ft 2 storey	Total sq.ft 2 storey
818	1636
673	1346
737	1474
821	6568
972	13608
1257	29514
Total	27146

Sq.ft 2 storey	Total sq.ft 2 storey
818	1636
707	9898
824	6240
808	9996
827	18194
948	8532
972	8484
627	11578
1145	8015
948	18116
1275	3825
1439	1439
Total	166,289

APPENDIX D

Drainage Strategy Design Drawings



NOTES:

- THESE NOTES ARE INTENDED TO AUGMENT DRAWINGS AND SPECIFICATIONS. WHERE CONFLICT OF REQUIREMENTS EXISTS THE ORDER OF PRECEDENCE SHALL BE AS SHOWN IN THE SPECIFICATION. OTHERWISE THE STRICTEST PROVISION SHALL GOVERN.
- THIS DRAWING IS TO BE MADE IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS AND ARCHITECTS DRAWINGS.
- DRAWINGS NOT TO BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY DISCREPANCIES TO BE NOTIFIED TO THE ENGINEER AND FURTHER INSTRUCTIONS OBTAINED BEFORE WORK COMMENCED.
- THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE BUILDING IS FULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO SETTING THE ERECTION PROCEDURE AND SECURING AND ENSURE THAT THE BUILDING AND ITS COMPONENTS ARE SAFE DURING ERECTION. THIS INCLUDES THE ADDITION OF WATER TEMPORARY BRACING, GUTS OR E-SCANS WHERE NECESSARY. SUCH MATERIAL REMAINING THE PROPERTY OF THE CONTRACTOR ON COMPLETION AND FOR ERECTION THAT THE WORKS AND ANY ADJACENT PROPERTIES ARE SAFE IN THE TEMPORARY CONDITION.

PRIVATE DRAINAGE NOTES:

- DRAINAGE SYSTEMS TO COMPLY WITH THE FOLLOWING STANDARDS:
 - BS EN 752:2008
 - BUILDING REGULATIONS APPROVED DOCUMENT PART H: 2015 EDITION
- ALL COMPONENTS USED IN DRAINAGE SYSTEMS TO COMPLY WITH THE FOLLOWING:
 - BS EN 475:2011
- ALL DRAINAGE SYSTEMS AND COMPONENTS TO BE CONSTRUCTED AND TESTED TO THE FULL SATISFACTION OF THE BUILDING REGULATIONS INSPECTOR
- ALL DRAINAGE TO BE CONSTRUCTED AND TESTED IN ACCORDANCE WITH BS EN 1917:2015
- PIPES UP TO 2250 TO BE VITRIFIED CLAY, VITRIFIED CLAY PIPES AND FITTINGS TO COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 12013-1, 2013-2, 2013-3 AND 2013-4 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS 65 ENDS PIPE CRUSHING STRENGTH
- PRECAST CONCRETE MANHOLES TO BE IN ACCORDANCE WITH BS EN 1917:2002 AND BS 5911-3:2010, 4:2002 AND TO BE KITEMARKED. PRECAST CONCRETE RINGS AND COVER SLABS TO BE JOINTED WITH CEMENT MORTAR UNLESS NOTED OTHERWISE
- PRECAST CONCRETE UNITS SHALL HAVE SULPHATE RESISTING PORTLAND CEMENT TO BS EN 197-1:2011
- MANHOLE COVERS AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 1241-1 TO 1241-4. MANHOLE COVERS AND FRAMES TO BE OF A NON-ROOTING DESIGN WITH CUSHION INSERTS AND KITEMARKED. LOAD CLASS D400 COVERS TO BE USED IN ALL LOCATIONS. ALL COVERS TO BE BAGED "F" OR "B" AS APPROPRIATE. MANHOLE COVER SLABS AND ACCESS TO BE IN ACCORDANCE WITH CONCRETE PIPE ASSOCIATION TECHNICAL BULLETIN ISSUED SEPTEMBER 2001.
- CLASS 2 BEDDING DETAIL SHALL BE PROVIDED:
 - WHERE COVER TO PIPE BARREL IS
 - +1.2M IN VEHICULAR TRAFFICKED AREAS
 - +0.3M IN AREAS INACCESSIBLE TO VEHICLES
 - AT ALL ROAD GULLY, YARD GULLY, RWP, SVP AND DRAINAGE CHANNEL BRANCHES
 - AREAS OF DEEP ROOTING VEGETATION
 - PIPE RUNS NEAR BUILDINGS IN ACCORDANCE WITH TYPICAL SECTIONS ON AWP DRAWINGS
 - WHERE TWO PIPES CROSS WITH A CLEAR GAP OF 300MM, CLASS 2 BEDDING TO EXTEND A MINIMUM OF 1.0M FROM THE CENTRE OF THE CROSSING POINT & EXTENDED TO WITHIN 150MM OF THE NEAREST FLEXIBLE JOINT, WHERE REQUIRED.
- PIPE BEDDING MATERIALS TO COMPLY GENERALLY WITH SHW - SERIES 500 - CLASS 503. GRANULAR BEDDING MATERIALS TO ALSO COMPLY WITH BS EN 12543-1 THE GRANULAR BEDDING MATERIAL TABLE ON THIS DRAWING.
- SELECTED BACKFILL MATERIAL TO BE PROVIDED ABOVE THE PIPE SURROUND TO A HEIGHT OF 300MM MINIMUM ABOVE THE TOP OF THE PIPE. SELECTED BACKFILL MATERIAL TO BE CLASS B - LOWER TRENCH FILL MATERIAL IN ACCORDANCE WITH SHW - SERIES 600 TABLE 61 & 6 TO COMPREHENSIVE OF UNIFORM SOIL. FREE FROM STONES LARGER THAN 40MM. LUMPS OF CLAY OVER 100MM. FROZEN MATERIAL & VEGETABLE MATTER. SELECTED BACKFILL MATERIAL TO BE PLACED & COMPACTED IN LAYERS NOT EXCEEDING 150MM IN THICKNESS. SHOULD THE MATERIAL BE UNSUITABLE OR WEATHER CONDITIONS AFFECT THE MATERIALS STABILITY, THEN A SUITABLE HARD GRANULAR MATERIAL SHALL BE USED.
- GENERAL BACKFILL TO DRAINAGE TRENCHES OTHER THAN FILTER DRAINS IN VEHICULAR TRAFFICKED AREAS ABOVE THE PIPE BEDDING & SELECTED BACKFILL SHALL BE CLASS 1, 2 OR 3 GENERAL FILL MATERIAL IN ACCORDANCE WITH SHW - SERIES 600.
- GENERAL BACKFILL UNDER NON-VEHICULAR TRAFFICKED AREAS TO BE SUITABLE & AS-DUG MATERIAL COMPACTED IN ACCORDANCE WITH SHW - SERIES 600 IN LAYERS NOT EXCEEDING 225MM. EACH LAYER COMPACTED TO FORM A STABLE TRENCH BACKFILL. SHOULD THE MATERIAL BE UNSUITABLE OR WEATHER CONDITIONS AFFECT THE MATERIALS STABILITY, THEN A HARD GRANULAR MATERIAL SHALL BE USED UP TO FORMATION LEVEL.
- ALL CONCRETE TO BE DESIGNATED CONCRETE TO CONFORM TO BS 8900-2.
- NO MECHANICAL COMPACTION OF FILL MATERIAL WITHIN 300MM OF THE CROWN OF ANY PIPE.
- 150MM Ø CLAY TO BE MINIMUM CRUSHING STRENGTH 40KN/M² 225MM Ø CLAY TO BE MINIMUM CRUSHING STRENGTH 45KN/M² 300MM Ø CLAY TO BE MINIMUM CRUSHING STRENGTH 50KN/M² CONCRETE TO BE MINIMUM CRUSHING STRENGTH CLASS NO 120 (40KN/M²)
- CLAY SEWERS TO COMPLY WITH BS 2054-1:1991. CONCRETE SEWERS TO COMPLY WITH BS EN 1916:2002 AND BS EN 1917:2002.
- SULPHATE RESISTANCE CEMENT (C20-C22) AND PRECAST CONCRETE PRODUCTS MUST BE USED ON A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
- EXISTING FLOWS IN WATERCOURSES, SEWERS AND LAND DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING THE WORKS OR HANDLED ACCORDINGLY.
- ANY GRADIENTS OF DRAINS ARE INDICATIVE ONLY AND THE CONTRACTOR SHALL INSTALL DRAINS TO THE INVERT LEVELS SHOWN FOR EACH MANHOLE.
- THE FIRST MANHOLE(S) UPSTREAM FROM THE CONNECTION TO THE EXISTING PUBLIC SEWER AND/OR WATERCOURSE SHOULD, WHEN CONSTRUCTED, BE FITTED WITH A SCREEN IN ORDER TO PREVENT DEBRIS ENTERING THE PUBLIC SEWER. THE SCREEN SHOULD NOT BE REMOVED UNTIL IMMEDIATELY PRIOR TO THE OCCUPATION OF PREMISES TO BE SERVED BY THE SEWER.

KEY:

- Existing Surface Water Drainage
- Existing Combined Water Drainage
- Existing Surface Water Manhole
- Existing Foul Water Manhole
- Proposed Foul Water Drainage
- Proposed Foul Water Manhole
- Proposed Surface Water Drainage
- Proposed Surface Water Manhole
- Proposed Attenuation Basin

Rev	Description	Date	By	Chk	App
P5	SITE PLAN UPDATE	16.01.25	DC	SC	JAG
P4	UPDATED BASIN SIZE	08.01.24	HD	SC	JAG
P3	AMENDED FOR TOP WATER LEVEL LESS THAN 1.2m	07.01.25	RP	SC	JAG
P2	AMENDED AS PER LATEST LAYOUT	23.12.24	CM	SC	JAG
-	FIRST ISSUE	06.12.24	HD	SC	-

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Project:
Proposed Scheme at Barugh Green, Barnsley,
South Yorkshire

Client:
Avant Homes

Drawing:
Proposed Drainage Strategy (Sheet 1 of 2)

Role:
Civil Engineering

Drawing
Status:
FOR APPROVAL

Scale:
1:250

Project
Originator:
BGB - AWP - ZZ - XX - DR - C - 3301

Quantity
Code:
S3

Rev:
P5

APPENDIX E

ICP SuDS Calculations

Alan Wood & Partners (Hull)		Page 1
341 Beverley Road Hull HU5 1LD		
Date 06/12/2024 11:22 File	Designed by msmith Checked by	
Innovyze Source Control 2020.1.3		
ICP SUDS Mean Annual Flood Input Return Period (years) 1 Soil 0.450 Area (ha) 50.000 Urban 0.000 SAAR (mm) 781 Region Number Region 3 Results 1/s QBAR Rural 249.7 QBAR Urban 249.7 Q1 year 214.7 Q1 year 214.7 Q30 years 438.9 Q100 years 519.3		
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APPENDIX F

Hydraulic Calculations

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
	Designed by: CM	Checked by: SC	Approved By: JAG
Report Details: Type: Junctions Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		



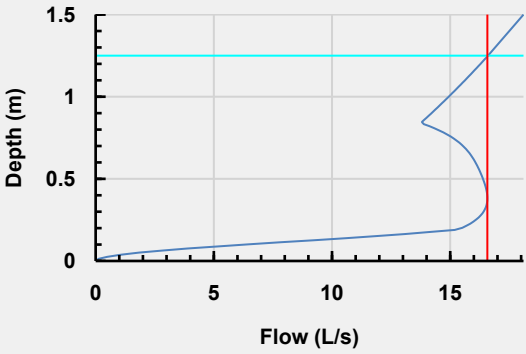
Alan Wood & Partners

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
S20	Manhole	431825.682	407889.748	79.700	1.500	78.200	Circular	1.500
S22	Manhole	431723.792	407839.997	83.750	2.712	81.038	Circular	1.200
S16	Manhole	431816.836	407782.856	83.910	2.615	81.295	Circular	1.500
S2	Manhole	431814.939	407722.065	85.640	1.640	84.000	Circular	1.500
S23	Manhole	431731.034	407895.712	81.250	1.550	79.700	Circular	1.500
S8	Manhole	431913.938	407788.552	81.850	1.850	80.000	Circular	1.800
S17	Manhole	431816.955	407809.561	82.700	1.787	80.913	Circular	1.500
S18	Manhole	431817.941	407829.552	82.000	1.550	80.450	Circular	1.200
S19	Manhole	431820.499	407856.677	80.860	1.550	79.310	Circular	1.200
S9	Manhole	431904.148	407844.788	80.200	1.600	78.600	Circular	1.200
S10	Manhole	431902.286	407862.731	79.750	1.500	78.250	Circular	1.500
S15	Manhole	431745.030	407781.340	85.800	2.564	83.236	Circular	1.200
S4	Manhole	431896.157	407724.020	84.250	2.050	82.200	Circular	1.500
S3	Manhole	431855.682	407723.046	85.300	2.000	83.300	Circular	1.500
S24	Manhole	431783.659	407889.044	80.050	2.050	78.000	Circular	1.500
S1	Manhole	431778.935	407721.491	87.150	1.650	85.500	Circular	1.200
S7	Manhole	431918.518	407764.703	82.610	1.510	81.100	Circular	1.200
S14	Manhole	431733.421	407810.347	85.050	1.350	83.700	Circular	1.200
S25	Manhole	431694.512	407900.535	82.450	1.450	81.000	Circular	1.200
S11	Manhole	431843.312	407783.303	82.800	1.350	81.450	Circular	1.200
S12	Manhole	431887.064	407784.293	82.500	1.500	81.000	Circular	1.500
S6	Manhole	431922.559	407740.241	83.200	1.500	81.700	Circular	1.500
S21	Manhole	431762.177	407834.884	82.850	1.450	81.400	Circular	1.200
S13	Manhole	431870.158	407862.731	80.050	1.350	78.700	Circular	1.200
FC	Manhole	431893.019	407891.964	79.300	2.200	77.100	Circular	1.500
Existing SW4	Manhole	431900.888	407904.634	79.300	2.949	76.351	Circular	0.001
S5	Manhole	431924.382	407728.346	83.600	1.600	82.000	Circular	1.500

Name	Lock
S20	All
S22	All
S16	All
S2	All
S23	All
S8	All
S17	All
S18	All
S19	All
S9	All
S10	All
S15	All
S4	All
S3	All
S24	None
S1	All
S7	All
S14	None
S25	All
S11	All
S12	All
S6	All
S21	All
S13	All
FC	All
Existing SW4	None
S5	All

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
		Designed by: CM	Checked by: SC		Approved By: JAG
Report Details: Type: Junctions Storm Phase: Phase		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
S20	Outlet	2.006	Free Discharge
S22	Outlet	3.001	Free Discharge
S16	Outlet	2.002	Free Discharge
S2	Outlet	1.001	Free Discharge
S23	Outlet	3.002	Free Discharge
S8	Outlet	1.008	Free Discharge
S17	Outlet	2.003	Free Discharge
S18	Outlet	2.004	Free Discharge
S19	Outlet	2.005	Free Discharge
S9	Outlet	1.009	Free Discharge
S10	Outlet	1.010	Free Discharge
S15	Outlet	2.001	Free Discharge
S4	Outlet (1)	1.004	Free Discharge
S3	Outlet	1.003	Free Discharge
S24	Outlet	3.003	Free Discharge
S1	Outlet	1.000	Free Discharge
S7	Outlet	1.007	Free Discharge
S14	Outlet	2.000	Free Discharge
S25	Outlet	3.100	Free Discharge
S11	Outlet	1.100	Free Discharge
S12	Outlet	1.101	Free Discharge
S6	Outlet	1.006	Free Discharge
S21	Outlet	3.000	Free Discharge
S13	Outlet	1.200	Free Discharge
FC	Outlet	1.012	Hydro-Brake®
	Invert Level (m)	77.100	
	Design Depth (m)	1.250	
	Design Flow (L/s)	16.6	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☒	
	Unit Reference	SHE-0180-1660-1250-1660	
			

S5	Outlet	1.005	Free Discharge
----	--------	-------	----------------

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
	Designed by: CM	Checked by: SC	Approved By: JAG
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		


Alan Wood & Partners



Basin 01

Type : Pond

Dimensions

Exceedance Level (m)	79.000
Depth (m)	1.850
Base Level (m)	77.150
Freeboard (mm)	300
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	3.00
Total Volume (m³)	1953.948

Depth (m)	Area (m²)	Volume (m³)
0.000	980.00	0.000
1.800	1670.75	2358.200

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	2.006
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	1.010
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	3.004
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.011
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	89.788
Friction Scheme	Manning's n
n	0.022

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
	Designed by: CM	Checked by: SC	Approved By: JAG
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		


Alan Wood & Partners



Basin 02

Type : Pond

Dimensions

Exceedance Level (m)	79.000
Depth (m)	1.350
Base Level (m)	77.650
Freeboard (mm)	300
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	3.00
Total Volume (m³)	584.107

Depth (m)	Area (m²)	Volume (m³)
0.000	430.10	0.000
1.250	750.00	728.357

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	3.003
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	3.004
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	67.757
Friction Scheme	Manning's n
n	0.022

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
Report Details: Type: Network Design Criteria Storm Phase: Phase		Designed by: CM	Checked by: SC		Approved By: JAG
		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐
--------------	--------------------------

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
	Designed by: CM	Checked by: SC	Approved By: JAG
Report Details: Type: Outfall Details Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		


Alan Wood & Partners

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Existing SW4	Free Discharge		

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
	Designed by: CM	Checked by: SC	Approved By: JAG
Report Title: Rainfall Analysis Criteria	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		


Alan Wood & Partners

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR	Type: FSR	
Region	England And Wales	
M5-60 (mm)	19.0	
Ratio R	0.351	
Summer	☒	
Winter	☒	

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0.000
30.0	0.000
100.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
Report Details: Type: Inflows Summary Storm Phase: Phase		Designed by: CM	Checked by: SC		Approved By: JAG
		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			

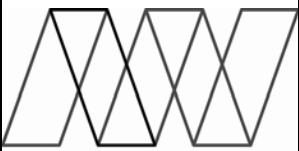


FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
CA 1	FSR: 1 years: +0 %: 15 mins: Winter	0.07	8.8	4.076
CA 2	FSR: 1 years: +0 %: 15 mins: Winter	0.09	11.7	5.435
CA 3	FSR: 1 years: +0 %: 15 mins: Winter	0.14	17.2	7.972
CA 4	FSR: 1 years: +0 %: 15 mins: Winter	0.14	18.4	8.506
CA 5	FSR: 1 years: +0 %: 15 mins: Winter	0.17	21.1	9.748
CA 6	FSR: 1 years: +0 %: 15 mins: Winter	0.10	12.1	5.609
CA 7	FSR: 1 years: +0 %: 15 mins: Winter	0.08	10.0	4.610
CA 8	FSR: 1 years: +0 %: 15 mins: Winter	0.13	15.9	7.384
CA 9	FSR: 1 years: +0 %: 15 mins: Winter	0.17	21.1	9.748
CA 10	FSR: 1 years: +0 %: 15 mins: Winter	0.09	11.5	5.315
CA 11	FSR: 1 years: +0 %: 15 mins: Winter	0.12	15.3	7.091
CA 12	FSR: 1 years: +0 %: 15 mins: Winter	0.13	15.9	7.384
CA 13	FSR: 1 years: +0 %: 15 mins: Winter	0.04	4.5	2.070
CA 14	FSR: 1 years: +0 %: 15 mins: Winter	0.08	9.6	4.433
CA 15	FSR: 1 years: +0 %: 15 mins: Winter	0.08	9.6	4.433
CA 16	FSR: 1 years: +0 %: 15 mins: Winter	0.12	14.7	6.791
CA 17	FSR: 1 years: +0 %: 15 mins: Winter	0.15	19.1	8.860
CA 18	FSR: 1 years: +0 %: 15 mins: Winter	0.25	31.9	14.772
CA 19	FSR: 1 years: +0 %: 15 mins: Winter	0.08	10.2	4.727
CA 20	FSR: 1 years: +0 %: 15 mins: Winter	0.04	5.1	2.364
CA 21	FSR: 1 years: +0 %: 15 mins: Winter	0.14	17.9	8.272

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
		Designed by: CM	Checked by: SC		Approved By: JAG
Report Details: Type: Inflows Summary Storm Phase: Phase		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			

CA 22	FSR: 1 years: +0 %: 15 mins: Winter	0.13	15.9	7.384
CA 23	FSR: 1 years: +0 %: 15 mins: Winter	0.10	12.1	5.609
CA 24	FSR: 1 years: +0 %: 15 mins: Winter	0.08	10.0	4.610

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
Report Details: Type: Inflows Summary Storm Phase: Phase		Designed by: CM	Checked by: SC		Approved By: JAG
		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
CA 1	FSR: 30 years: +0 %: 15 mins: Winter	0.07	21.6	9.981
CA 2	FSR: 30 years: +0 %: 15 mins: Winter	0.09	28.8	13.314
CA 3	FSR: 30 years: +0 %: 15 mins: Winter	0.14	42.2	19.530
CA 4	FSR: 30 years: +0 %: 15 mins: Winter	0.14	45.0	20.835
CA 5	FSR: 30 years: +0 %: 15 mins: Winter	0.17	51.6	23.877
CA 6	FSR: 30 years: +0 %: 15 mins: Winter	0.10	29.7	13.746
CA 7	FSR: 30 years: +0 %: 15 mins: Winter	0.08	24.4	11.283
CA 8	FSR: 30 years: +0 %: 15 mins: Winter	0.13	39.1	18.087
CA 9	FSR: 30 years: +0 %: 15 mins: Winter	0.17	51.6	23.877
CA 10	FSR: 30 years: +0 %: 15 mins: Winter	0.09	28.1	13.026
CA 11	FSR: 30 years: +0 %: 15 mins: Winter	0.12	37.5	17.364
CA 12	FSR: 30 years: +0 %: 15 mins: Winter	0.13	39.1	18.087
CA 13	FSR: 30 years: +0 %: 15 mins: Winter	0.04	10.9	5.061
CA 14	FSR: 30 years: +0 %: 15 mins: Winter	0.08	23.4	10.851
CA 15	FSR: 30 years: +0 %: 15 mins: Winter	0.08	23.4	10.851
CA 16	FSR: 30 years: +0 %: 15 mins: Winter	0.12	36.0	16.641
CA 17	FSR: 30 years: +0 %: 15 mins: Winter	0.15	46.9	21.705
CA 18	FSR: 30 years: +0 %: 15 mins: Winter	0.25	78.2	36.174
CA 19	FSR: 30 years: +0 %: 15 mins: Winter	0.08	25.0	11.574
CA 20	FSR: 30 years: +0 %: 15 mins: Winter	0.04	12.5	5.790
CA 21	FSR: 30 years: +0 %: 15 mins: Winter	0.14	43.8	20.259

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
		Designed by: CM	Checked by: SC		Approved By: JAG
Report Details: Type: Inflows Summary Storm Phase: Phase		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			

CA 22	FSR: 30 years: +0 %: 15 mins: Winter	0.13	39.1	18.087
CA 23	FSR: 30 years: +0 %: 15 mins: Winter	0.10	29.7	13.746
CA 24	FSR: 30 years: +0 %: 15 mins: Winter	0.08	24.4	11.283

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
Report Details: Type: Inflows Summary Storm Phase: Phase		Designed by: CM	Checked by: SC		Approved By: JAG
		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
CA 1	FSR: 100 years: +40 %: 15 mins: Winter	0.07	39.1	18.075
CA 2	FSR: 100 years: +40 %: 15 mins: Winter	0.09	52.1	24.101
CA 3	FSR: 100 years: +40 %: 15 mins: Winter	0.14	76.4	35.366
CA 4	FSR: 100 years: +40 %: 15 mins: Winter	0.14	81.5	37.727
CA 5	FSR: 100 years: +40 %: 15 mins: Winter	0.17	93.4	43.229
CA 6	FSR: 100 years: +40 %: 15 mins: Winter	0.10	53.8	24.890
CA 7	FSR: 100 years: +40 %: 15 mins: Winter	0.08	44.2	20.435
CA 8	FSR: 100 years: +40 %: 15 mins: Winter	0.13	70.8	32.747
CA 9	FSR: 100 years: +40 %: 15 mins: Winter	0.17	93.4	43.229
CA 10	FSR: 100 years: +40 %: 15 mins: Winter	0.09	51.0	23.576
CA 11	FSR: 100 years: +40 %: 15 mins: Winter	0.12	68.0	31.439
CA 12	FSR: 100 years: +40 %: 15 mins: Winter	0.13	70.8	32.747
CA 13	FSR: 100 years: +40 %: 15 mins: Winter	0.04	19.8	9.171
CA 14	FSR: 100 years: +40 %: 15 mins: Winter	0.08	42.5	19.646
CA 15	FSR: 100 years: +40 %: 15 mins: Winter	0.08	42.5	19.646
CA 16	FSR: 100 years: +40 %: 15 mins: Winter	0.12	65.1	30.125
CA 17	FSR: 100 years: +40 %: 15 mins: Winter	0.15	84.9	39.296
CA 18	FSR: 100 years: +40 %: 15 mins: Winter	0.25	141.6	65.497
CA 19	FSR: 100 years: +40 %: 15 mins: Winter	0.08	45.3	20.960
CA 20	FSR: 100 years: +40 %: 15 mins: Winter	0.04	22.7	10.479
CA 21	FSR: 100 years: +40 %: 15 mins: Winter	0.14	79.3	36.680

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
	Designed by: CM	Checked by: SC	Approved By: JAG
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		


Alan Wood & Partners

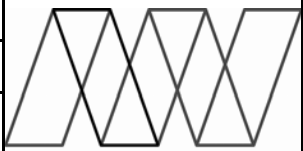
CA 22	FSR: 100 years: +40 %: 15 mins: Winter	0.13	70.8	32.747
CA 23	FSR: 100 years: +40 %: 15 mins: Winter	0.10	53.8	24.890
CA 24	FSR: 100 years: +40 %: 15 mins: Winter	0.08	44.2	20.435

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
		Designed by: CM	Checked by: SC		Approved By: JAG
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S20	FSR: 1 years: +0 %: 15 mins: Winter	79.700	78.200	78.323	0.123	73.4	0.217	0.000	71.5	37.611	OK
S22	FSR: 1 years: +0 %: 15 mins: Winter	83.750	81.038	81.127	0.089	35.8	0.100	0.000	33.7	17.104	OK
S16	FSR: 1 years: +0 %: 15 mins: Winter	83.910	81.295	81.407	0.112	41.6	0.198	0.000	39.3	19.929	OK
S2	FSR: 1 years: +0 %: 15 mins: Winter	85.640	84.000	84.103	0.103	34.9	0.183	0.000	32.8	16.455	OK
S23	FSR: 1 years: +0 %: 15 mins: Winter	81.250	79.700	79.804	0.104	59.9	0.184	0.000	58.5	29.485	OK
S8	FSR: 1 years: +0 %: 15 mins: Winter	81.850	80.000	80.156	0.156	125.5	0.398	0.000	122.1	64.109	OK
S17	FSR: 1 years: +0 %: 15 mins: Winter	82.700	80.913	81.017	0.104	43.8	0.184	0.000	42.4	21.975	OK
S18	FSR: 1 years: +0 %: 15 mins: Winter	82.000	80.450	80.543	0.093	52.0	0.106	0.000	50.9	26.391	OK
S19	FSR: 1 years: +0 %: 15 mins: Winter	80.860	79.310	79.417	0.107	60.4	0.121	0.000	58.7	30.804	OK
S9	FSR: 1 years: +0 %: 15 mins: Winter	80.200	78.600	78.779	0.179	138.0	0.202	0.000	133.2	71.430	OK
S10	FSR: 1 years: +0 %: 15 mins: Winter	79.750	78.250	78.385	0.135	154.6	0.238	0.000	152.9	81.642	OK
S15	FSR: 1 years: +0 %: 15 mins: Winter	85.800	83.236	83.307	0.071	21.4	0.080	0.000	20.6	10.206	OK
S4	FSR: 1 years: +0 %: 15 mins: Winter	84.250	82.200	82.365	0.165	52.3	0.291	0.000	48.9	25.917	OK
S3	FSR: 1 years: +0 %: 15 mins: Winter	85.300	83.300	83.399	0.099	44.6	0.175	0.000	43.5	21.886	OK
S24	FSR: 1 years: +0 %: 15 mins: Winter	80.050	78.000	78.146	0.146	74.5	0.258	0.000	71.8	36.864	OK
S1	FSR: 1 years: +0 %: 15 mins: Winter	87.150	85.500	85.564	0.064	18.4	0.072	0.000	17.7	8.501	OK
S7	FSR: 1 years: +0 %: 15 mins: Winter	82.610	81.100	81.253	0.153	61.4	0.174	0.000	59.4	32.292	OK
S14	FSR: 1 years: +0 %: 15 mins: Winter	85.050	83.700	83.771	0.071	10.0	0.080	0.000	9.3	4.604	OK
S25	FSR: 1 years: +0 %: 15 mins: Winter	82.450	81.000	81.050	0.050	11.5	0.056	0.000	11.0	5.311	OK
S11	FSR: 1 years: +0 %: 15 mins: Winter	82.800	81.450	81.542	0.092	19.1	0.104	0.000	17.6	8.848	OK
S12	FSR: 1 years: +0 %: 15 mins: Winter	82.500	81.000	81.099	0.099	49.6	0.174	0.000	48.2	23.607	OK
S6	FSR: 1 years: +0 %: 15 mins: Winter	83.200	81.700	81.956	0.256	57.4	0.453	0.000	56.3	30.111	OK
S21	FSR: 1 years: +0 %: 15 mins: Winter	82.850	81.400	81.487	0.087	15.9	0.098	0.000	14.7	7.374	OK
S13	FSR: 1 years: +0 %: 15 mins: Winter	80.050	78.700	78.764	0.064	10.0	0.072	0.000	9.3	4.603	OK
FC	FSR: 1 years: +0 %: 480 mins: Winter	79.300	77.100	77.419	0.319	15.0	0.564	0.000	14.9	450.561	Surcharged
Existing SW4	FSR: 1 years: +0 %: 360 mins: Winter	79.300	76.351	76.432	0.081	14.9	0.000	0.000	14.9	377.418	OK
S5	FSR: 1 years: +0 %: 15 mins: Winter	83.600	82.000	82.106	0.106	48.9	0.188	0.000	47.1	25.887	OK

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
		Designed by: CM	Checked by: SC		Approved By: JAG
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S20	FSR: 30 years: +0 %: 15 mins: Winter	79.700	78.200	78.423	0.223	182.7	0.395	0.000	178.1	92.180	OK
S22	FSR: 30 years: +0 %: 15 mins: Winter	83.750	81.038	81.186	0.148	88.0	0.167	0.000	83.8	41.920	OK
S16	FSR: 30 years: +0 %: 15 mins: Winter	83.910	81.295	81.493	0.198	102.2	0.350	0.000	97.8	48.847	OK
S2	FSR: 30 years: +0 %: 15 mins: Winter	85.640	84.000	84.178	0.178	86.3	0.314	0.000	81.3	40.318	OK
S23	FSR: 30 years: +0 %: 15 mins: Winter	81.250	79.700	79.876	0.176	148.9	0.311	0.000	145.3	72.237	OK
S8	FSR: 30 years: +0 %: 15 mins: Winter	81.850	80.000	80.288	0.288	308.0	0.733	0.000	296.9	158.122	OK
S17	FSR: 30 years: +0 %: 15 mins: Winter	82.700	80.913	81.095	0.182	108.7	0.321	0.000	105.8	53.875	OK
S18	FSR: 30 years: +0 %: 15 mins: Winter	82.000	80.450	80.610	0.160	129.3	0.181	0.000	127.0	64.704	OK
S19	FSR: 30 years: +0 %: 15 mins: Winter	80.860	79.310	79.499	0.189	150.4	0.213	0.000	146.8	75.523	OK
S9	FSR: 30 years: +0 %: 15 mins: Winter	80.200	78.600	78.918	0.318	336.0	0.360	0.000	328.5	176.128	OK
S10	FSR: 30 years: +0 %: 15 mins: Winter	79.750	78.250	78.483	0.233	381.3	0.411	0.000	378.3	201.159	OK
S15	FSR: 30 years: +0 %: 15 mins: Winter	85.800	83.236	83.352	0.116	52.0	0.131	0.000	50.6	25.008	OK
S4	FSR: 30 years: +0 %: 15 mins: Winter	84.250	82.200	82.662	0.462	129.7	0.817	0.000	115.5	63.541	Surcharged
S3	FSR: 30 years: +0 %: 15 mins: Winter	85.300	83.300	83.467	0.167	110.0	0.296	0.000	108.1	53.583	OK
S24	FSR: 30 years: +0 %: 15 mins: Winter	80.050	78.000	78.278	0.278	184.4	0.492	0.000	176.6	90.332	OK
S1	FSR: 30 years: +0 %: 15 mins: Winter	87.150	85.500	85.607	0.107	45.0	0.121	0.000	44.1	20.793	OK
S7	FSR: 30 years: +0 %: 15 mins: Winter	82.610	81.100	81.322	0.222	146.6	0.252	0.000	144.0	80.314	OK
S14	FSR: 30 years: +0 %: 15 mins: Winter	85.050	83.700	83.839	0.139	24.4	0.157	0.000	22.3	11.273	OK
S25	FSR: 30 years: +0 %: 15 mins: Winter	82.450	81.000	81.078	0.078	28.1	0.088	0.000	27.6	12.985	OK
S11	FSR: 30 years: +0 %: 15 mins: Winter	82.800	81.450	81.615	0.165	46.9	0.187	0.000	43.5	21.685	OK
S12	FSR: 30 years: +0 %: 15 mins: Winter	82.500	81.000	81.164	0.164	121.7	0.291	0.000	120.2	57.695	OK
S6	FSR: 30 years: +0 %: 15 mins: Winter	83.200	81.700	82.039	0.339	135.8	0.599	0.000	134.1	74.571	OK
S21	FSR: 30 years: +0 %: 15 mins: Winter	82.850	81.400	81.553	0.153	39.1	0.173	0.000	36.4	18.070	OK
S13	FSR: 30 years: +0 %: 15 mins: Winter	80.050	78.700	78.806	0.106	24.4	0.120	0.000	23.0	11.273	OK
FC	FSR: 30 years: +0 %: 480 mins: Winter	79.300	77.100	77.840	0.740	16.8	1.308	0.000	16.6	787.964	Surcharged
Existing SW4	FSR: 30 years: +0 %: 30 mins: Summer	79.300	76.351	76.451	0.100	15.4	0.000	0.000	15.4	39.193	OK
S5	FSR: 30 years: +0 %: 15 mins: Winter	83.600	82.000	82.219	0.219	115.5	0.387	0.000	110.8	63.513	OK

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CM	Checked by: SC	
		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S20	FSR: 100 years: +40 %: 15 mins: Winter	79.700	78.200	79.351	1.151	275.7	2.033	0.000	265.4	166.676	Surcharged
S22	FSR: 100 years: +40 %: 15 mins: Winter	83.750	81.038	81.790	0.752	141.9	0.851	0.000	126.2	75.171	Surcharged
S16	FSR: 100 years: +40 %: 15 mins: Winter	83.910	81.295	82.029	0.734	175.9	1.297	0.000	150.2	88.429	Surcharged
S2	FSR: 100 years: +40 %: 15 mins: Winter	85.640	84.000	85.079	1.079	146.3	1.906	0.000	124.7	72.182	Surcharged
S23	FSR: 100 years: +40 %: 15 mins: Winter	81.250	79.700	81.096	1.396	229.5	2.467	0.000	207.9	130.761	Flood Risk
S8	FSR: 100 years: +40 %: 15 mins: Winter	81.850	80.000	81.434	1.434	450.3	3.649	0.000	425.7	287.338	Surcharged
S17	FSR: 100 years: +40 %: 15 mins: Winter	82.700	80.913	81.542	0.629	170.0	1.111	0.000	150.4	97.685	Surcharged
S18	FSR: 100 years: +40 %: 15 mins: Winter	82.000	80.450	81.151	0.701	192.8	0.793	0.000	178.9	117.222	Surcharged
S19	FSR: 100 years: +40 %: 15 mins: Winter	80.860	79.310	80.452	1.142	221.3	1.292	0.000	210.6	136.880	Surcharged
S9	FSR: 100 years: +40 %: 15 mins: Winter	80.200	78.600	79.125	0.525	496.4	0.594	0.000	491.3	320.004	Surcharged
S10	FSR: 100 years: +40 %: 15 mins: Winter	79.750	78.250	78.567	0.317	587.8	0.560	0.000	584.1	365.231	OK
S15	FSR: 100 years: +40 %: 15 mins: Winter	85.800	83.236	83.421	0.185	91.5	0.209	0.000	82.5	45.228	OK
S4	FSR: 100 years: +40 %: 15 mins: Winter	84.250	82.200	83.722	1.522	189.9	2.690	0.000	166.5	115.115	Surcharged
S3	FSR: 100 years: +40 %: 15 mins: Winter	85.300	83.300	84.526	1.226	176.8	2.166	0.000	150.8	96.964	Surcharged
S24	FSR: 100 years: +40 %: 15 mins: Winter	80.050	78.000	79.553	1.553	278.7	2.744	0.000	270.8	163.571	Surcharged
S1	FSR: 100 years: +40 %: 15 mins: Winter	87.150	85.500	85.679	0.179	81.5	0.202	0.000	69.9	37.435	OK
S7	FSR: 100 years: +40 %: 15 mins: Winter	82.610	81.100	82.088	0.988	214.9	1.117	0.000	225.9	146.326	Surcharged
S14	FSR: 100 years: +40 %: 15 mins: Winter	85.050	83.700	84.640	0.940	44.2	1.063	0.000	37.7	20.429	Surcharged
S25	FSR: 100 years: +40 %: 15 mins: Winter	82.450	81.000	81.169	0.169	51.0	0.192	0.000	35.3	23.468	OK
S11	FSR: 100 years: +40 %: 15 mins: Winter	82.800	81.450	82.788	1.338	84.9	1.513	0.000	67.9	38.706	Flood Risk
S12	FSR: 100 years: +40 %: 15 mins: Winter	82.500	81.000	82.172	1.172	209.5	2.071	0.000	186.8	104.141	Surcharged
S6	FSR: 100 years: +40 %: 15 mins: Winter	83.200	81.700	82.704	1.004	192.1	1.773	0.000	208.7	135.716	Surcharged
S21	FSR: 100 years: +40 %: 15 mins: Winter	82.850	81.400	82.050	0.650	70.8	0.736	0.000	48.4	32.589	Surcharged
S13	FSR: 100 years: +40 %: 15 mins: Winter	80.050	78.700	78.860	0.160	44.2	0.181	0.000	42.7	20.188	OK
FC	FSR: 100 years: +40 %: 960 mins: Winter	79.300	77.100	78.346	1.246	16.7	2.201	0.000	16.6	1551.050	Surcharged
Existing SW4	FSR: 100 years: +40 %: 15 mins: Summer	79.300	76.351	76.451	0.100	16.0	0.000	0.000	16.0	18.958	OK
S5	FSR: 100 years: +40 %: 15 mins: Winter	83.600	82.000	83.113	1.113	166.5	1.966	0.000	172.8	115.180	Surcharged

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
		Designed by: CM	Checked by: SC		Approved By: JAG
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Basin 01	FSR: 1 years: +0 %: 480 mins: Winter	77.421	77.421	0.271	0.271	42.0	278.277	0.000	0.000	15.0	450.784	85.758	OK
Basin 02	FSR: 1 years: +0 %: 240 mins: Winter	77.801	77.801	0.151	0.151	17.8	67.387	0.000	0.000	9.9	54.546	88.463	OK

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
		Designed by: CM	Checked by: SC		Approved By: JAG
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Basin 01	FSR: 30 years: +0 %: 480 mins: Winter	77.843	77.843	0.693	0.693	101.0	762.238	0.000	0.000	16.8	788.608	60.990	OK
Basin 02	FSR: 30 years: +0 %: 60 mins: Winter	77.870	77.870	0.220	0.220	98.7	99.884	0.000	0.000	49.5	97.821	82.900	OK

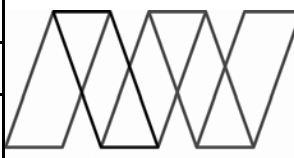
Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
		Designed by: CM	Checked by: SC		Approved By: JAG
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Basin 01	FSR: 100 years: +40 %: 960 mins: Winter	78.348	78.348	1.198	1.198	101.4	1428.834	0.000	0.000	16.7	1559.536	26.875	OK
Basin 02	FSR: 100 years: +40 %: 960 mins: Winter	78.348	78.349	0.698	0.699	27.6	357.432	0.000	0.000	22.9	480.492	38.807	OK

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
	Designed by: CM	Checked by: SC	Approved By: JAG
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		


Alan Wood & Partners

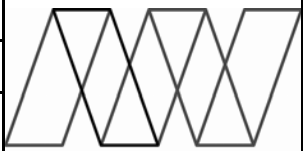


FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.006	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S6	S7	83.200	81.956	0.130	30.111	1.9	0.26	56.3	OK
2.002	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S16	S17	83.910	81.407	0.108	19.929	1.7	0.26	39.3	OK
2.003	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S17	S18	82.700	81.017	0.099	21.975	2.1	0.22	42.4	OK
2.004	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S18	S19	82.000	80.543	0.100	26.391	2.5	0.2	50.9	OK
2.005	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S19	S20	80.860	79.417	0.115	30.804	2.4	0.26	58.7	OK
1.007	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S7	S8	82.610	81.253	0.100	32.292	2.9	0.22	59.4	OK
1.008	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S8	S9	81.850	80.156	0.168	64.109	2.6	0.34	122.1	OK
1.009	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S9	S10	80.200	78.779	0.157	71.430	2.7	0.26	133.2	OK
2.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S15	S16	85.800	83.307	0.091	10.206	1.4	0.21	20.6	OK
2.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S14	S15	85.050	83.771	0.069	4.604	1.2	0.42	9.3	OK
3.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S22	S23	83.750	81.127	0.087	17.104	2.0	0.18	33.7	OK
3.002	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S23	S24	81.250	79.804	0.125	29.485	2.1	0.26	58.5	OK
3.100	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S25	S23	82.450	81.050	0.049	5.311	1.7	0.1	11.0	OK
1.100	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S11	S12	82.800	81.542	0.090	8.848	1.2	0.33	17.6	OK
1.101	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S12	S8	82.500	81.099	0.096	23.607	2.5	0.21	48.2	OK
1.200	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S13	S10	80.050	78.764	0.063	4.603	1.0	0.16	9.3	OK
3.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S21	S22	82.850	81.487	0.085	7.374	1.1	0.29	14.7	OK
1.011	FSR: 1 years: +0 %: 360 mins: Winter	Pipe	Basin 01	FC	79.000	77.418	0.291	377.767	0.3	0.16	15.0	OK
1.012	FSR: 1 years: +0 %: 360 mins: Winter	Pipe	FC	Existing SW4	79.300	77.415	0.100	377.418	2.1	0.99	14.9	Surcharged
1.004	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S4	S5	84.250	82.365	0.136	25.917	1.6	0.53	48.9	OK
1.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S1	S2	87.150	85.564	0.063	8.501	1.9	0.17	17.7	OK

Project: Residential Development Barugh Green, Barnsley				Date: 18/12/2024				 Alan Wood & Partners					
				Designed by: CM		Checked by: SC						Approved By: JAG	
Report Details: Type: Connections Summary Storm Phase: Phase				Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ									

1.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S2	S3	85.640	84.103	0.101	16.455	1.6	0.24	32.8	OK
1.003	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S3	S4	85.300	83.399	0.132	21.886	1.5	0.24	43.5	OK
3.004	FSR: 1 years: +0 %: 240 mins: Winter	Pipe	Basin 02	Basin 01	79.000	77.801	0.147	54.546	0.3	0.07	9.9	OK
1.010	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S10	Basin 01	79.750	78.385	0.111	81.642	5.0	0.14	152.9	OK
2.006	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S20	Basin 01	79.700	78.323	0.105	37.611	3.2	0.29	71.5	OK
3.003	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S24	Basin 02	80.050	78.146	0.104	36.864	3.3	0.36	71.8	OK
1.005	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S5	S6	83.600	82.106	0.181	25.887	1.1	0.27	47.1	OK

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024		 Alan Wood & Partners	
		Designed by: CM	Checked by: SC		Approved By: JAG
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

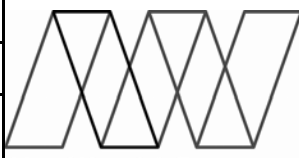
Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.006	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S6	S7	83.200	82.039	0.206	74.571	2.6	0.61	134.1	OK
2.002	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S16	S17	83.910	81.493	0.190	48.847	2.1	0.65	97.8	OK
2.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S17	S18	82.700	81.095	0.171	53.875	2.5	0.55	105.8	OK
2.004	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S18	S19	82.000	80.610	0.174	64.704	3.0	0.49	127.0	OK
2.005	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S19	S20	80.860	79.499	0.206	75.523	2.8	0.64	146.8	OK
1.007	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S7	S8	82.610	81.322	0.193	80.314	3.1	0.54	144.0	OK
1.008	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S8	S9	81.850	80.288	0.303	158.122	3.1	0.83	296.9	OK
1.009	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S9	S10	80.200	78.918	0.275	176.128	3.2	0.64	328.5	OK
2.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S15	S16	85.800	83.352	0.157	25.008	1.7	0.53	50.6	OK
2.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S14	S15	85.050	83.839	0.137	11.273	1.3	1.01	22.3	OK
3.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S22	S23	83.750	81.186	0.144	41.920	2.5	0.44	83.8	OK
3.002	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S23	S24	81.250	79.876	0.227	72.237	2.5	0.65	145.3	OK
3.100	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S25	S23	82.450	81.078	0.090	12.985	1.9	0.26	27.6	OK
1.100	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S11	S12	82.800	81.615	0.159	21.685	1.4	0.81	43.5	OK
1.101	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S12	S8	82.500	81.164	0.189	57.695	2.6	0.52	120.2	OK
1.200	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S13	S10	80.050	78.806	0.103	11.273	1.3	0.41	23.0	OK
3.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S21	S22	82.850	81.553	0.147	18.070	1.3	0.72	36.4	OK
1.011	FSR: 30 years: +0 %: 360 mins: Winter	Pipe	Basin 01	FC	79.000	77.840	0.300	592.990	0.3	0.18	17.2	Surcharged
1.012	FSR: 30 years: +0 %: 240 mins: Winter	Pipe	FC	Existing SW4	79.300	77.821	0.100	392.099	2.1	1.1	16.6	Surcharged
1.004	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S4	S5	84.250	82.662	0.300	63.541	1.6	1.24	115.5	Surcharged
1.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S1	S2	87.150	85.607	0.105	20.793	2.4	0.42	44.1	OK

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
	Designed by: CM	Checked by: SC	Approved By: JAG
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		


Alan Wood & Partners

1.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S2	S3	85.640	84.178	0.171	40.318	1.9	0.59	81.3	OK
1.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S3	S4	85.300	83.467	0.300	53.583	1.5	0.59	108.1	OK
3.004	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	Basin 02	Basin 01	79.000	77.870	0.289	97.821	0.8	0.35	49.5	OK
1.010	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S10	Basin 01	79.750	78.483	0.192	201.159	5.9	0.36	378.3	OK
2.006	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S20	Basin 01	79.700	78.423	0.187	92.180	3.8	0.73	178.1	OK
3.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S24	Basin 02	80.050	78.278	0.193	90.332	3.7	0.89	176.6	OK
1.005	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S5	S6	83.600	82.219	0.279	63.513	1.6	0.63	110.8	OK

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
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FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.006	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S6	S7	83.200	82.704	0.300	135.716	3.0	0.95	208.7	Surcharged
2.002	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	S16	S17	83.910	81.805	0.300	78.942	2.3	1.08	162.9	Surcharged
2.003	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S17	S18	82.700	81.542	0.300	97.685	2.5	0.79	150.4	Surcharged
2.004	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S18	S19	82.000	81.151	0.300	117.222	2.8	0.7	178.9	Surcharged
2.005	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S19	S20	80.860	80.452	0.300	136.880	3.0	0.92	210.6	Surcharged
1.007	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S7	S8	82.610	82.088	0.300	146.326	3.2	0.85	225.9	Surcharged
1.008	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S8	S9	81.850	81.434	0.375	287.338	3.9	1.19	425.7	Surcharged
1.009	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S9	S10	80.200	79.125	0.421	320.004	3.5	0.95	491.3	Surcharged
2.001	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	S15	S16	85.800	83.401	0.225	40.381	2.1	0.89	85.0	OK
2.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S14	S15	85.050	84.640	0.150	20.429	2.1	1.7	37.7	Surcharged
3.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S22	S23	83.750	81.790	0.300	75.171	2.3	0.67	126.2	Surcharged
3.002	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S23	S24	81.250	81.096	0.300	130.761	2.9	0.92	207.9	Flood Risk
3.100	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	S25	S23	82.450	81.108	0.225	20.939	1.8	0.42	45.2	OK
1.100	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S11	S12	82.800	82.788	0.225	38.706	1.7	1.26	67.9	Flood Risk
1.101	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S12	S8	82.500	82.172	0.300	104.141	2.6	0.81	186.8	Surcharged
1.200	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S13	S10	80.050	78.860	0.163	20.188	1.4	0.76	42.7	OK
3.000	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	S21	S22	82.850	81.814	0.225	29.053	1.5	1.21	60.9	Surcharged
1.011	FSR: 100 years: +40 %: 30 mins: Winter	Pipe	Basin 01	FC	79.000	77.868	0.300	47.545	0.4	0.18	17.3	Surcharged
1.012	FSR: 100 years: +40 %: 960 mins: Summer	Pipe	FC	Existing SW4	79.300	78.225	0.100	1537.396	2.1	1.1	16.6	Surcharged
1.004	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S4	S5	84.250	83.722	0.300	115.115	2.4	1.79	166.5	Surcharged
1.000	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	S1	S2	87.150	85.647	0.225	33.423	2.0	0.74	76.7	OK

Project: Residential Development Barugh Green, Barnsley		Date: 18/12/2024			 Alan Wood & Partners		
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: CM	Checked by: SC	Approved By: JAG			
		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ					

1.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S2	S3	85.640	85.079	0.300	72.182	1.8	0.9	124.7	Surchar ged
1.003	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S3	S4	85.300	84.526	0.300	96.964	2.1	0.82	150.8	Surchar ged
3.004	FSR: 100 years: +40 %: 60 mins: Winter	Pipe	Basin 02	Basin 01	79.000	78.016	0.300	123.100	1.3	0.67	95.0	OK
1.010	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S10	Basin 01	79.750	78.567	0.339	365.231	6.1	0.55	584.1	OK
2.006	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S20	Basin 01	79.700	79.351	0.300	166.676	3.8	1.09	265.4	Surchar ged
3.003	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S24	Basin 02	80.050	79.553	0.300	163.571	3.8	1.36	270.8	Surchar ged
1.005	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S5	S6	83.600	83.113	0.300	115.180	2.4	0.98	172.8	Surchar ged

Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
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Report Details: Type: Stormwater Control Results Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		


Alan Wood & Partners

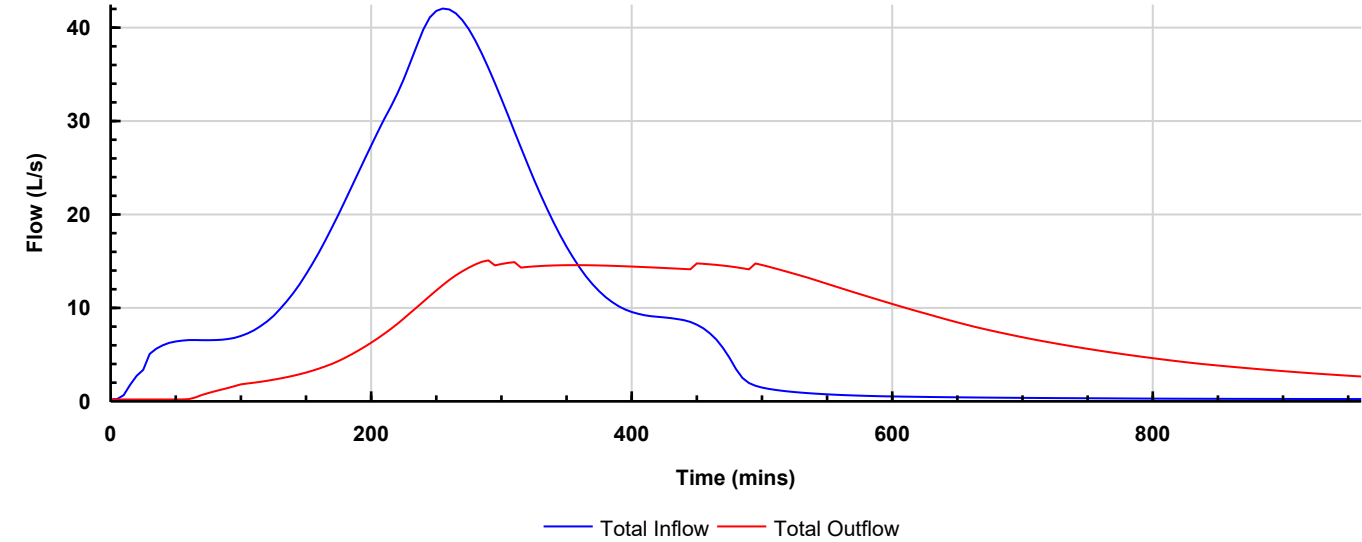


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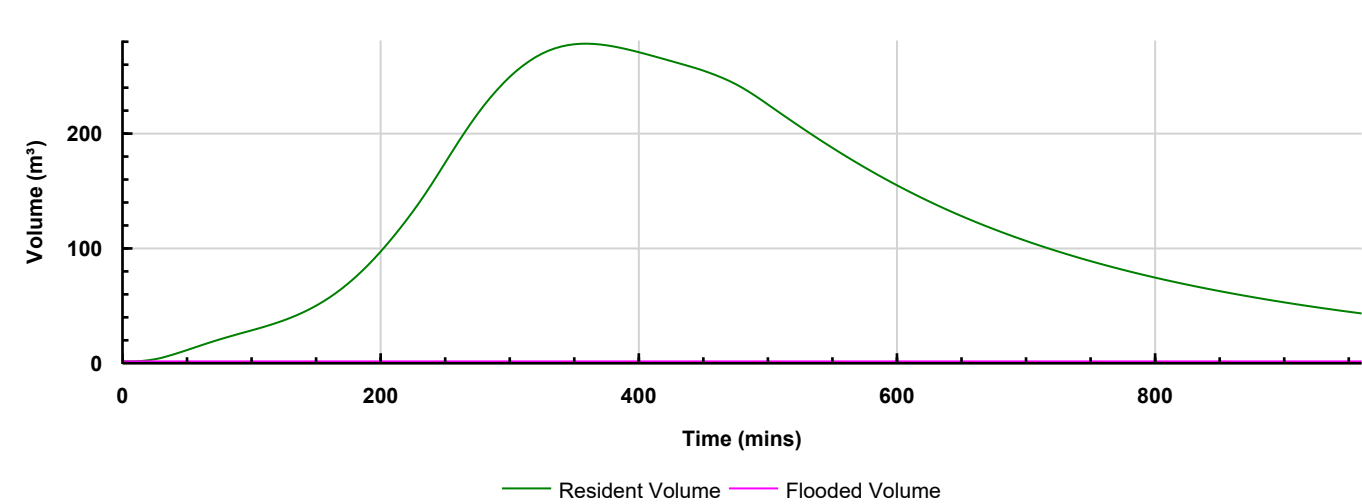
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Graphs

Flow Graph



Volume Graph

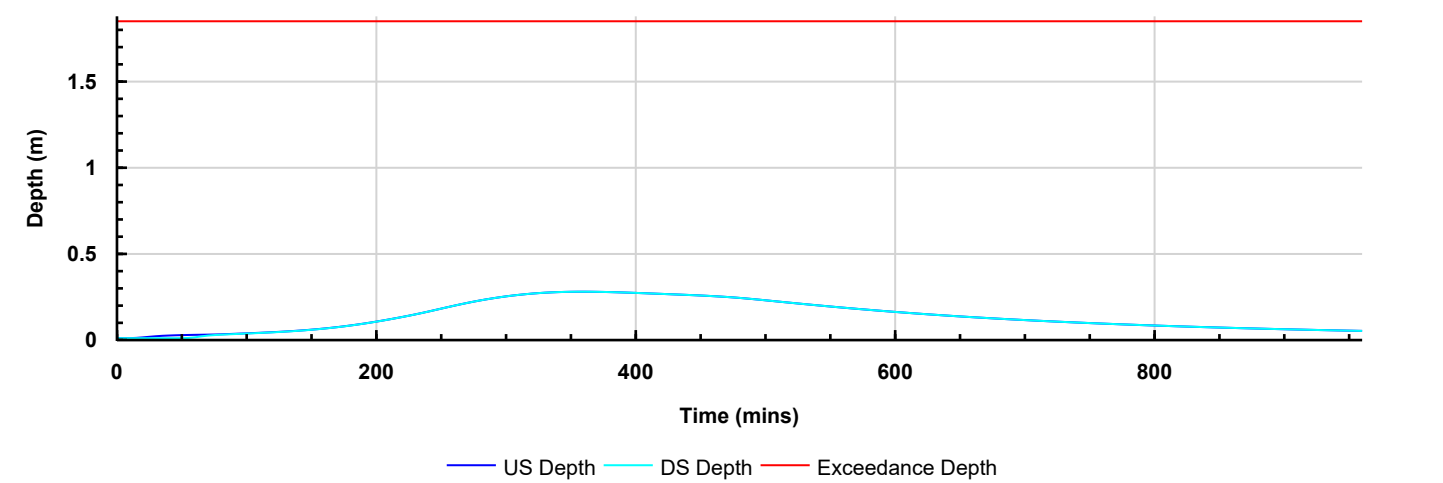


Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
	Designed by: CM	Checked by: SC	Approved By: JAG
Report Details: Type: Stormwater Control Results Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		



Alan Wood & Partners

Depth Graph



Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
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Alan Wood & Partners

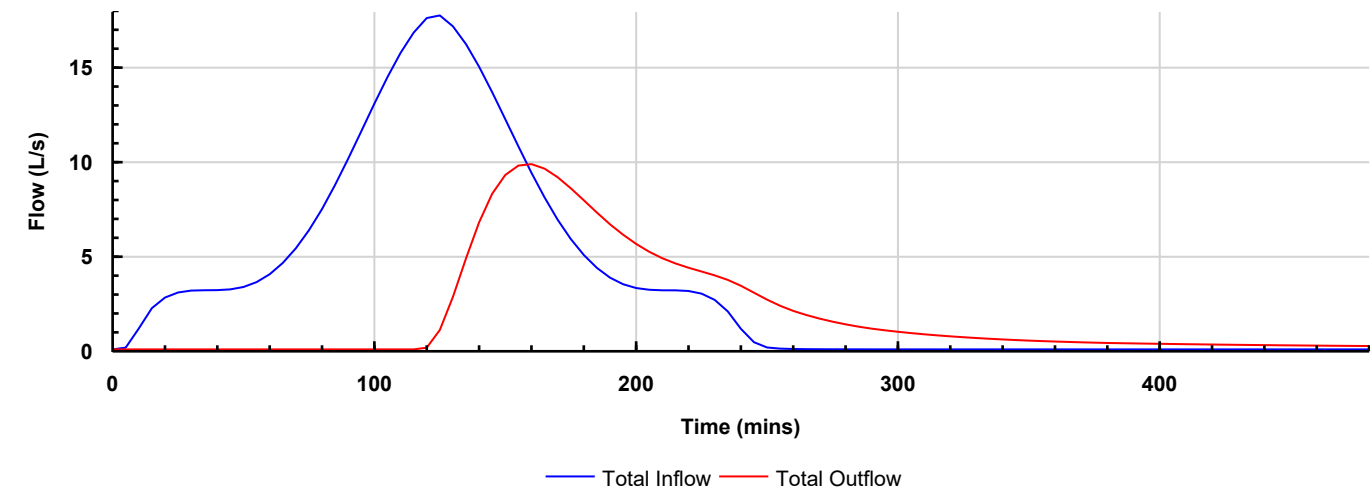


Basin 02
Critical by Return Period: FSR: 1 years: Increase Rainfall (%): +0: 240 mins: Winter

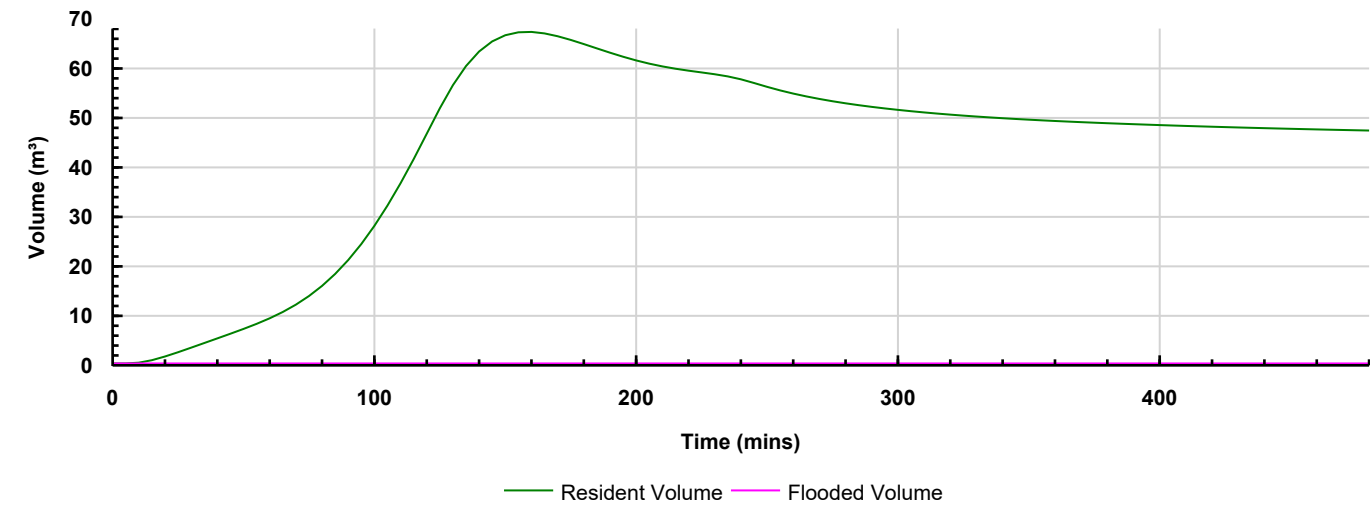
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Graphs

Flow Graph



Volume Graph

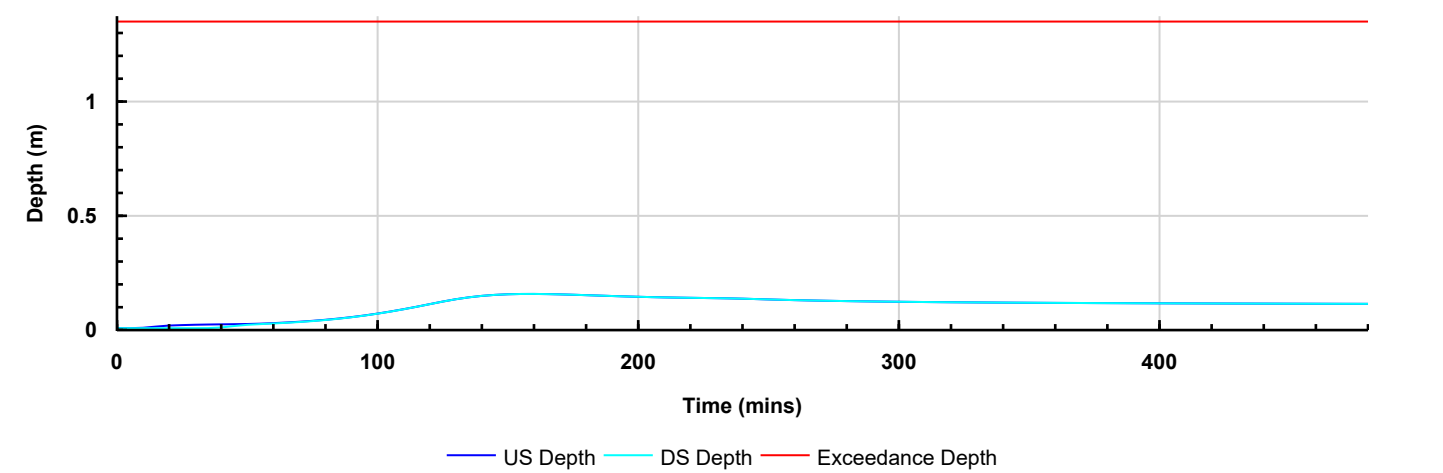


Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
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Depth Graph



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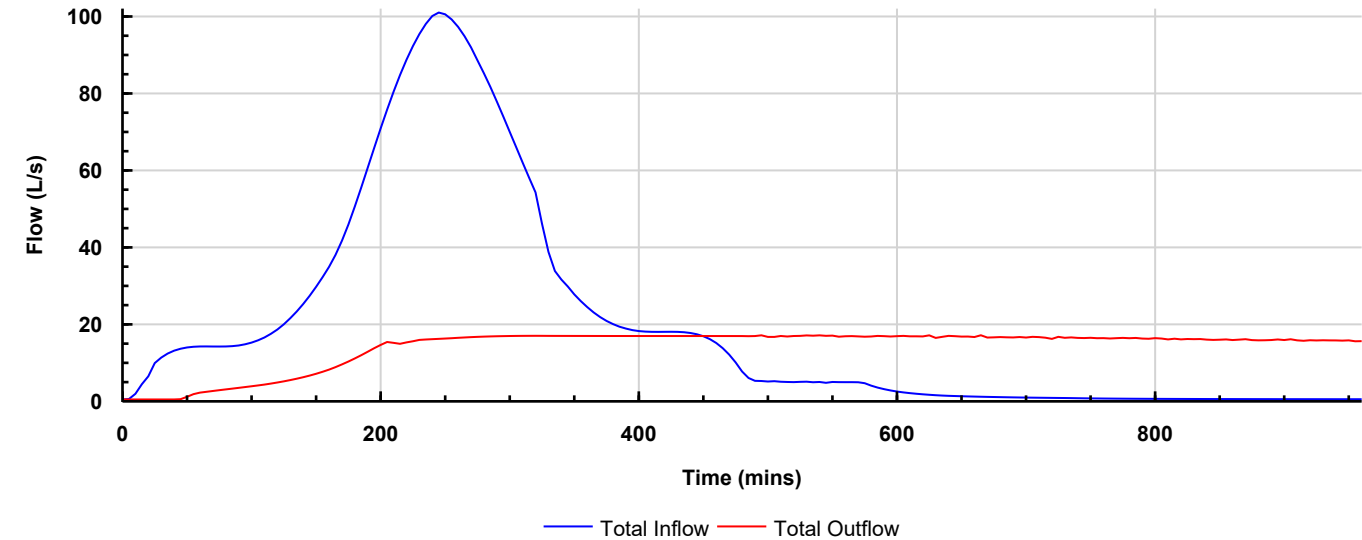


Basin 01
Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +0: 480 mins: Winter

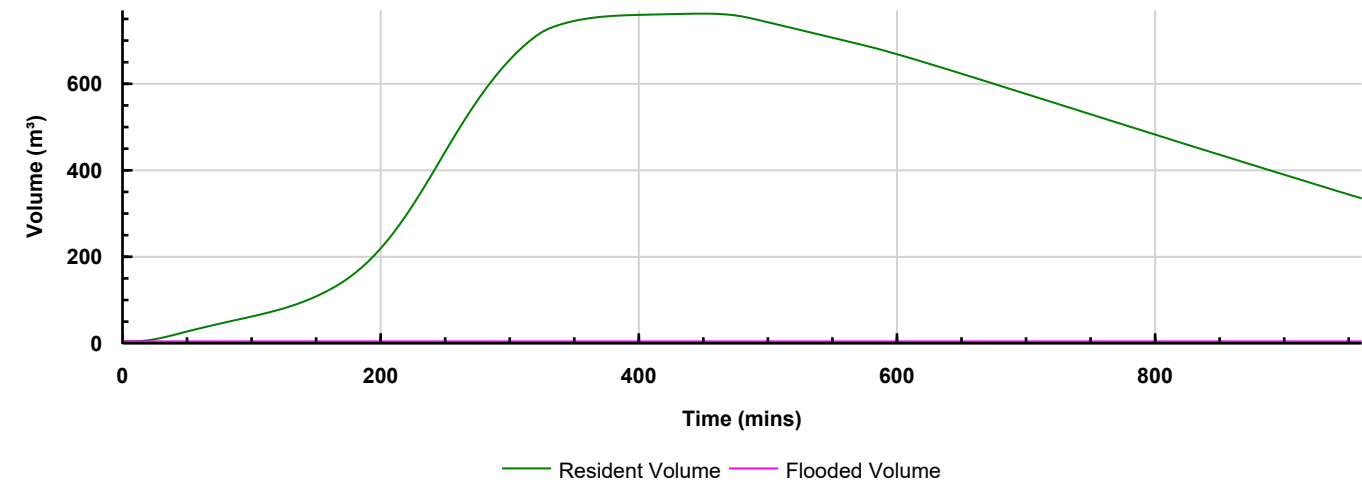
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Graphs

Flow Graph



Volume Graph

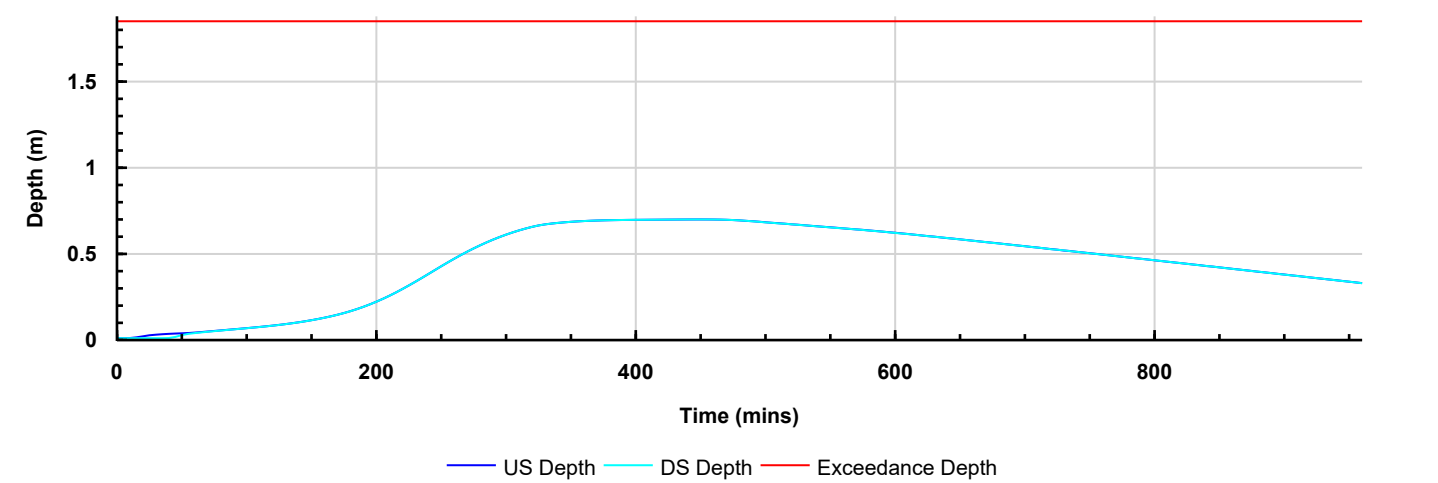


Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
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Depth Graph



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		Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			

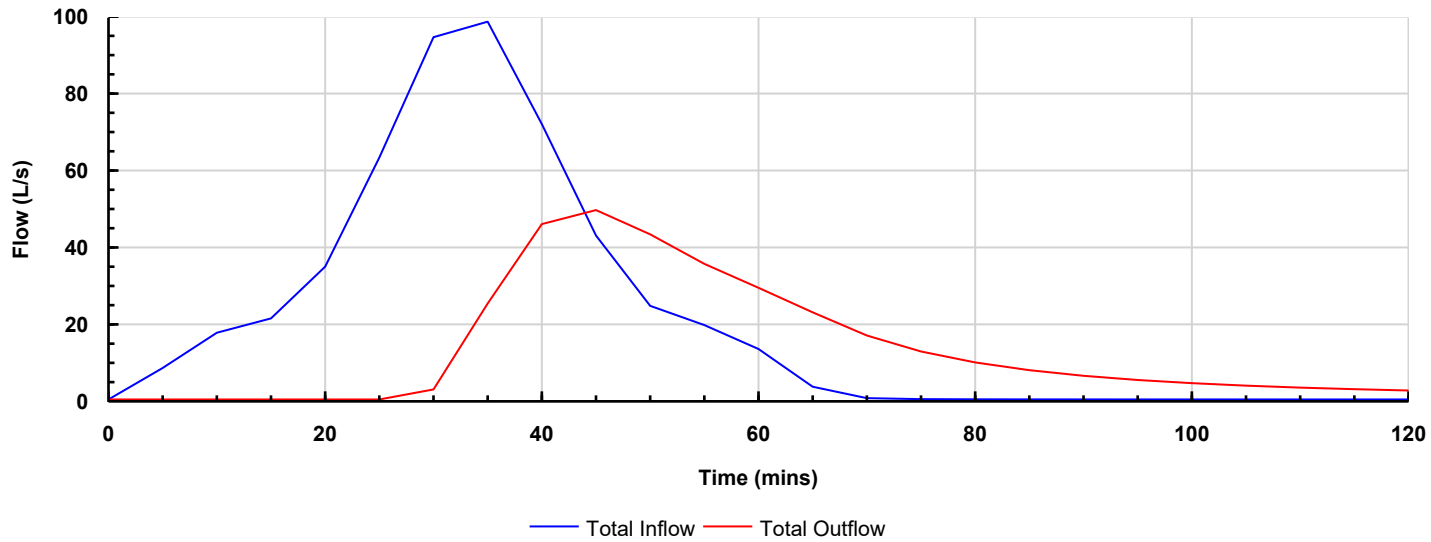


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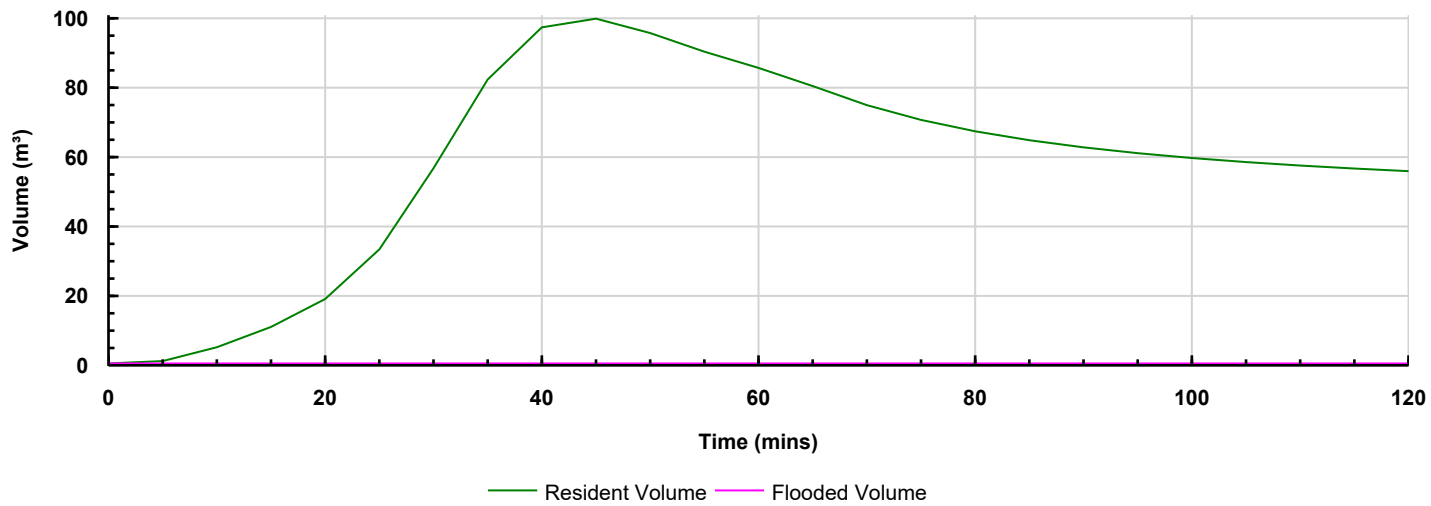
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Graphs

Flow Graph



Volume Graph

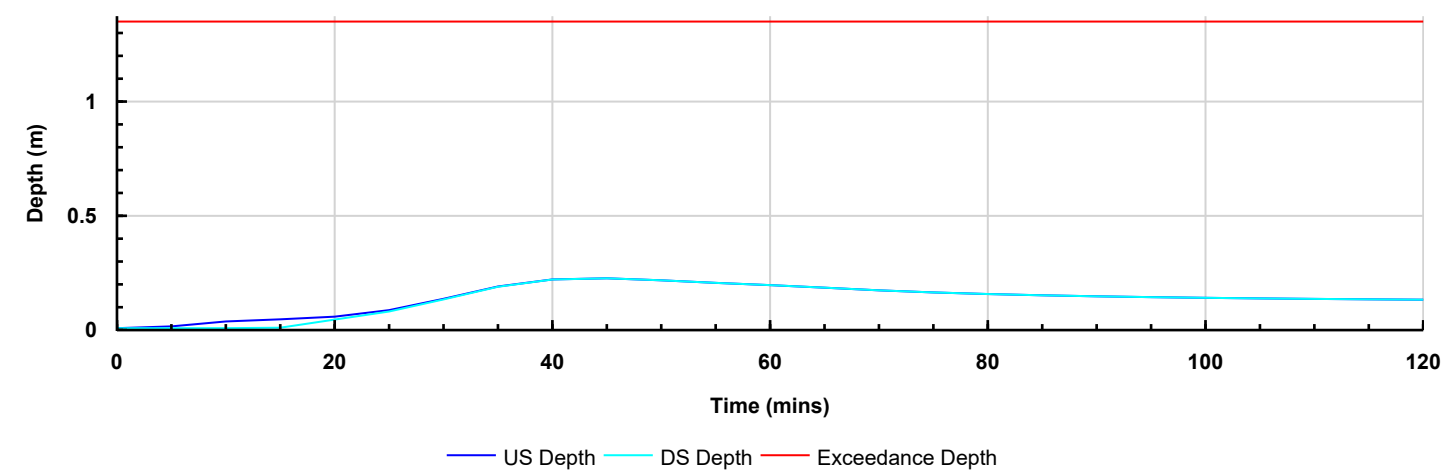


Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
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Report Details: Type: Stormwater Control Results Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ		



Alan Wood & Partners

Depth Graph



Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024			
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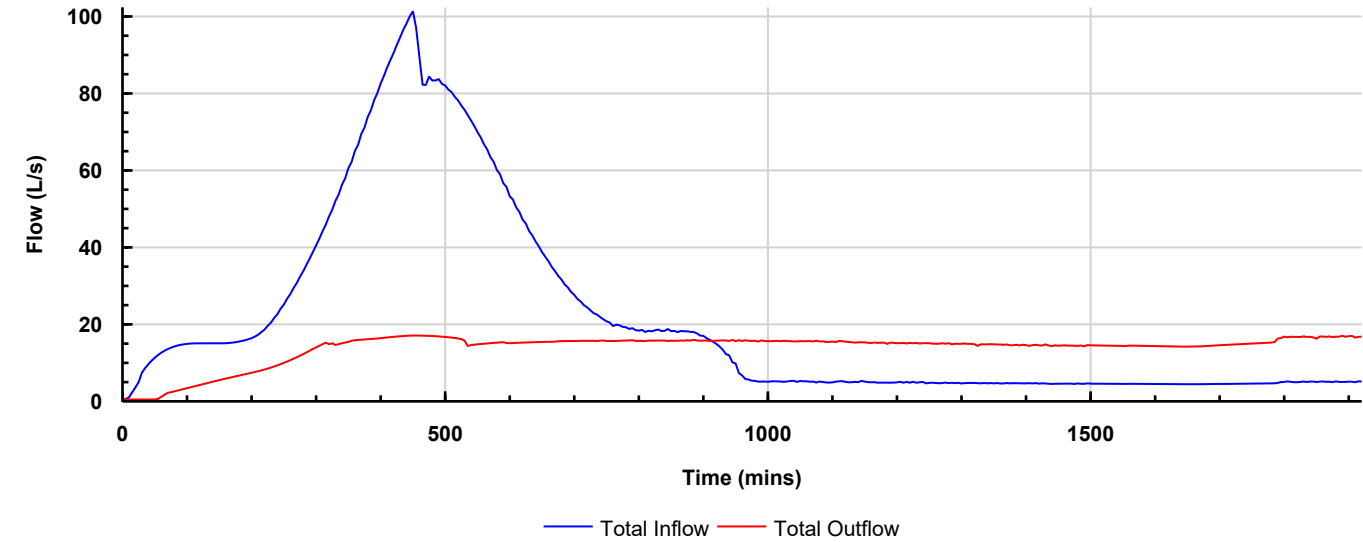


Basin 01
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +40: 960 mins: Winter

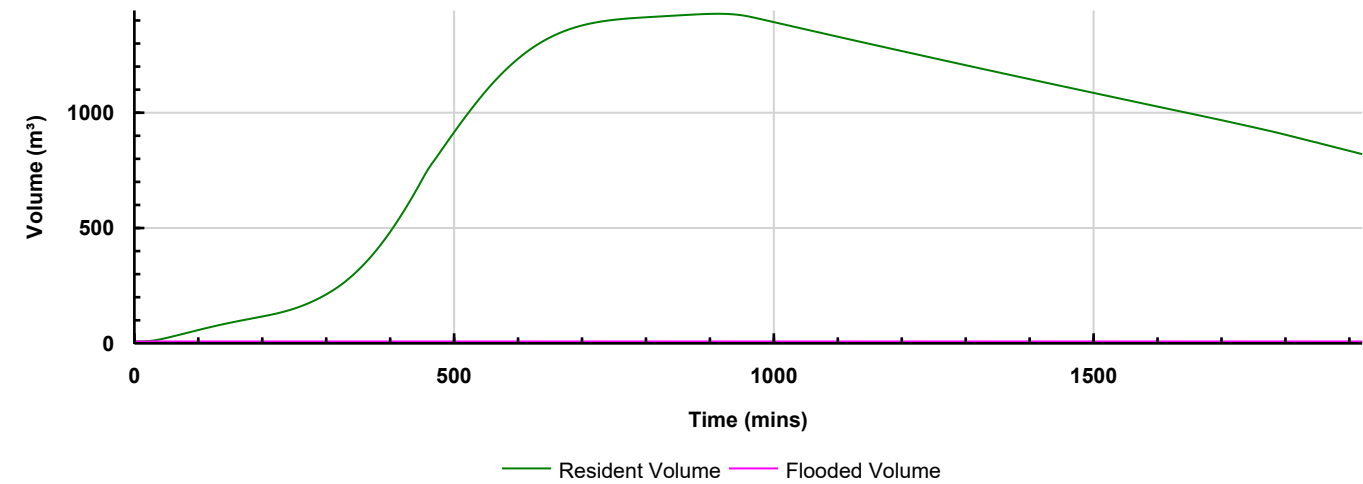
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Graphs

Flow Graph



Volume Graph

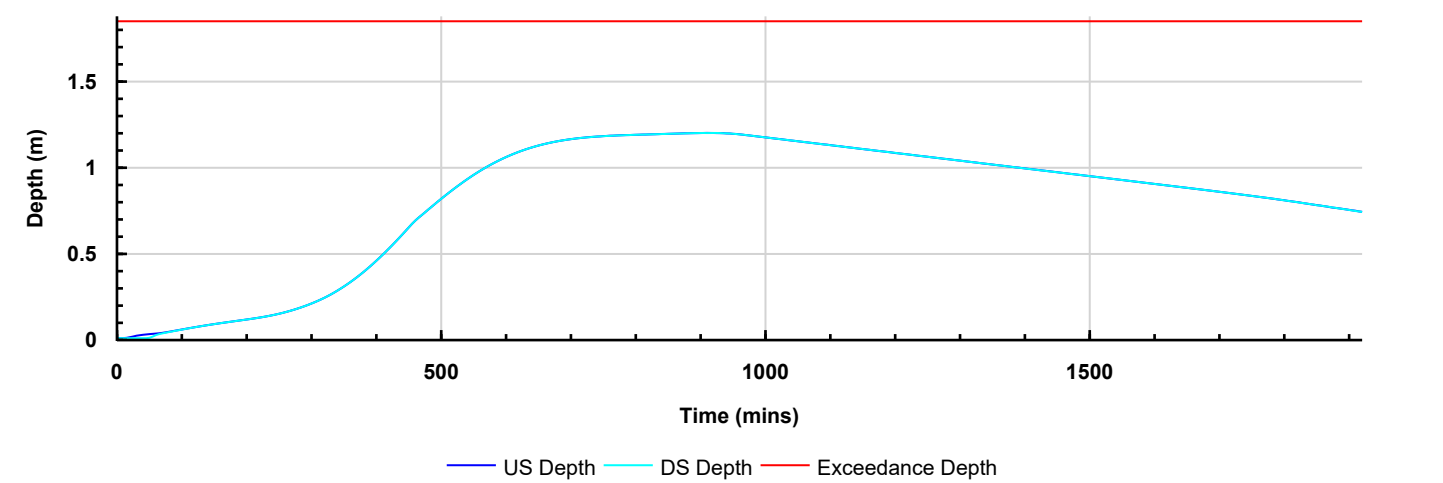


Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024		
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Depth Graph



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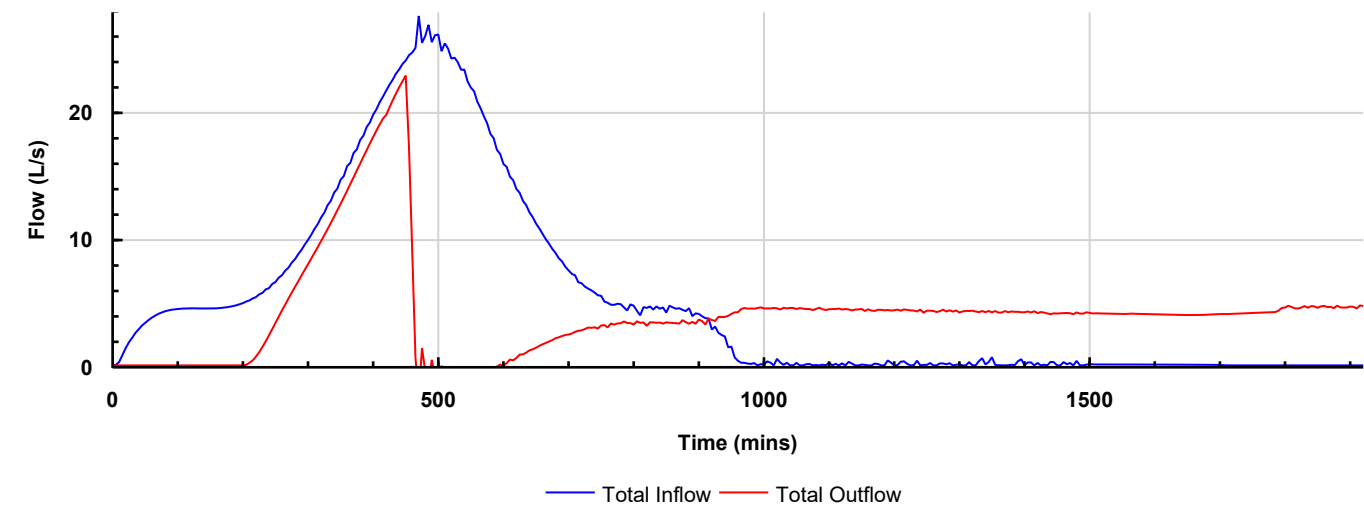


Basin 02
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +40: 960 mins: Winter

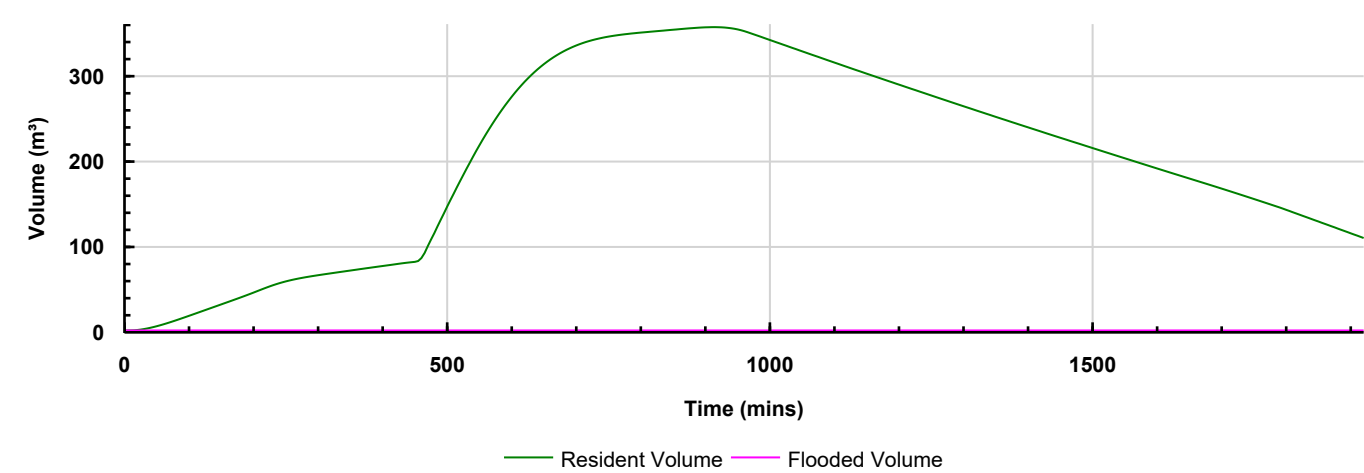
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Graphs

Flow Graph

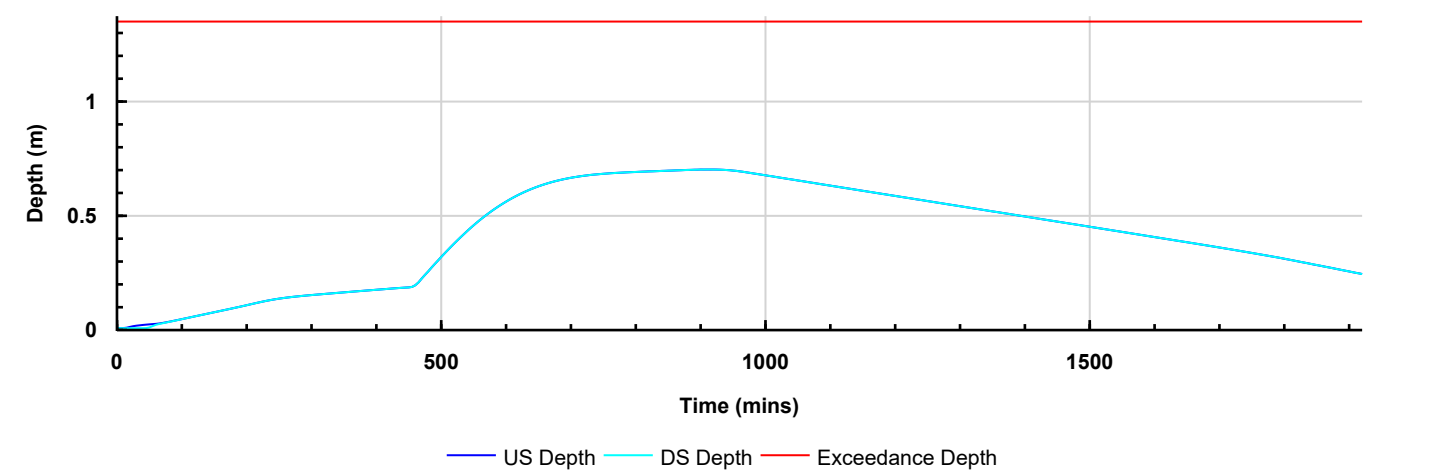


Volume Graph



Project: Residential Development Barugh Green, Barnsley	Date: 18/12/2024			 Alan Wood & Partners
	Designed by: CM	Checked by: SC	Approved By: JAG	
Report Details: Type: Stormwater Control Results Storm Phase: Phase	Company Address: Alan Wood & Partners 18 Howley Park Business Village, Pullan Way, Morley, Leeds, LS27 0BZ			

Depth Graph



APPENDIX G

CIRIA SuDS Manual Water Quality Matrices

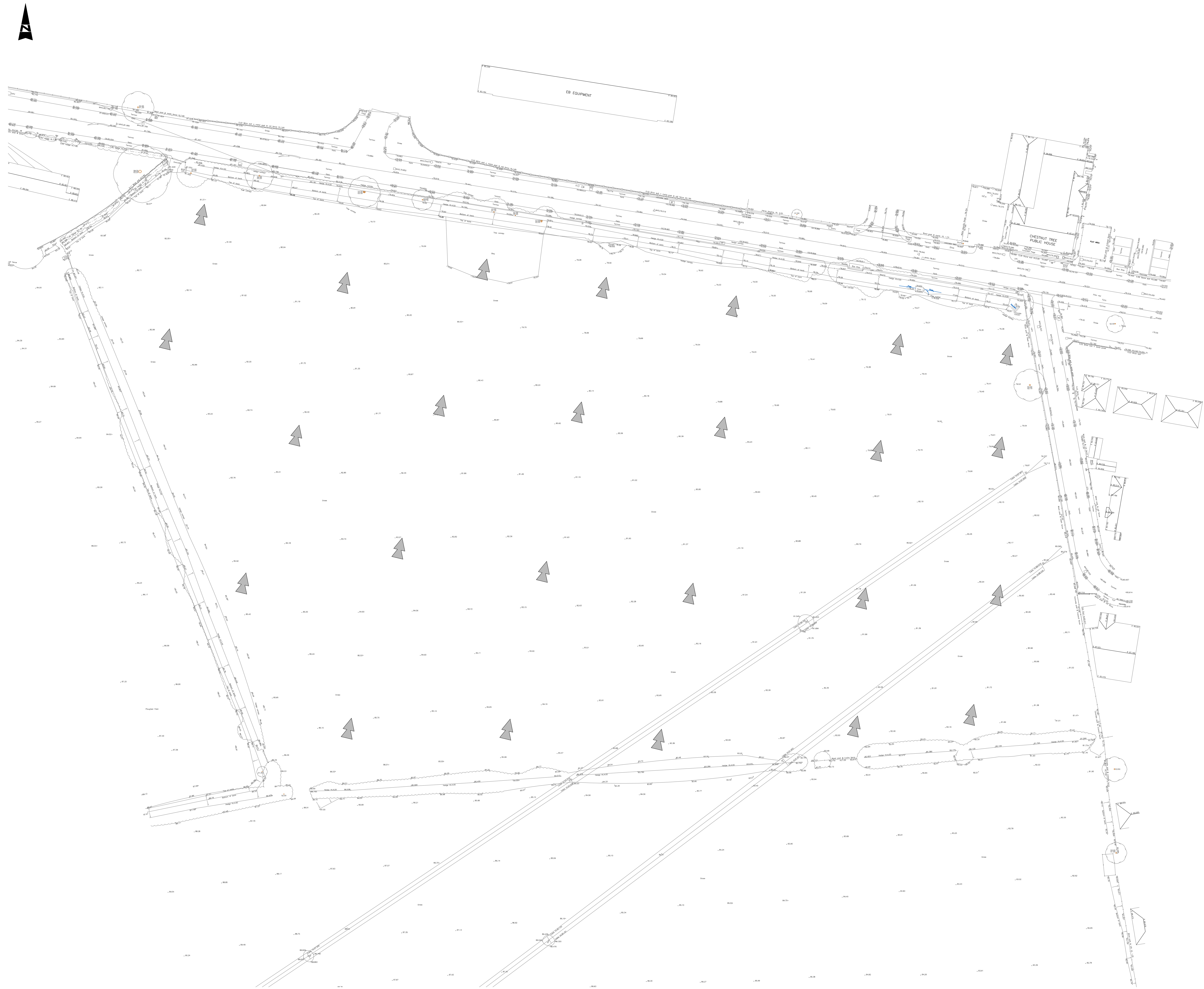
SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Residential roofing				
Pollution Hazard Level	Very low				
Pollution Hazard Indices					
TSS	0.2				
Metals	0.2				
Hydrocarbons	0.05				
SuDS components proposed					
Component 1	Filter drain (where the trench is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Filter drains should be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS		0.4			
Metals		0.4			
Hydrocarbons		0.4			
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices					
TSS		0.4	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England		
Metals		0.4			
Hydrocarbons		0.4			
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)				
Pollution Hazard Level	Low				
Pollution Hazard Indices					
TSS	0.5				
Metals	0.4				
Hydrocarbons	0.4				
SuDS components proposed		Detailed assessment of performance of designed component in reducing inflow concentrations of each pollutant type required as evidence of adopted indices. Enter indices approved by the environmental regulator in appropriate 'User Defined Indices' row below			
Component 1	Attenuation Lagoon				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.6				
Metals	0.5				
Hydrocarbons	0.6				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices		Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England		
TSS	0.6				
Metals	0.5				
Hydrocarbons	0.6				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Residential parking				
Pollution Hazard Level	Low				
Pollution Hazard Indices					
TSS	0.5				
Metals	0.4				
Hydrocarbons	0.4				
SuDS components proposed					
Component 1	Attenuation Lagoon	Detailed assessment of performance of designed component in reducing inflow concentrations of each pollutant type required as evidence of adopted indices. Enter indices approved by the environmental regulator in appropriate 'User Defined Indices' row below SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Filter drains should be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 2	Filter drain (where the trench is not designed as an infiltration component)				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS		0.8			
Metals		0.7			
Hydrocarbons		0.8			
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices					
TSS		0.8	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England		
Metals		0.7			
Hydrocarbons		0.8			
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

APPENDIX H

Surface Water Exceedance Flood Routing Drawing

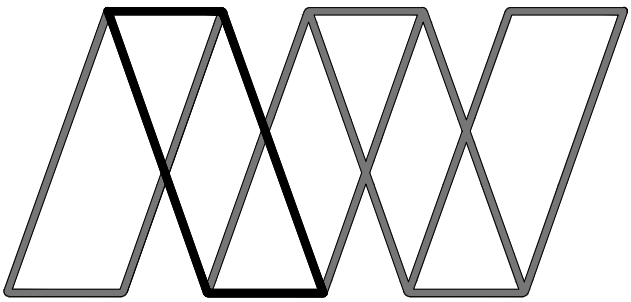


- NOTES:
1. THESE NOTES ARE INTENDED TO AUGMENT DRAWINGS AND SPECIFICATIONS. WHERE CONFLICT OF REQUIREMENTS EXIST THE ORDER OF PRECEDENCE SHALL BE AS SHOWN IN THE SPECIFICATION. OTHERWISE THE STRICTEST PROVISION SHALL GOVERN.
 2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS AND ARCHITECTS DRAWINGS.
 3. DRAWINGS NOT TO BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY DISCREPANCIES TO BE NOTIFIED TO THE ENGINEER AND FURTHER INSTRUCTIONS OBTAINED BEFORE WORK IS COMMENCED.
 4. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE BUILDING IS FULLY COMPLETED. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND SEQUENCE AND ENSURE THAT THE BUILDING AND ITS COMPONENTS ARE SAFE DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE-DOWNS WHICH MAY BE NECESSARY. SUCH MATERIAL REMAINING THE PROPERTY OF THE CONTRACTOR ON COMPLETION, AND FOR ENSURING THAT THE WORKS AND ANY ADJACENT PROPERTIES ARE SAFE IN THE TEMPORARY CONDITION.

KEY

= EXISTING SURFACE WATER
 EXCEEDANCE FLOW PATH ROUTE

P1	FIRST ISSUE	04.12.24	HD	SC	--
Rev	Description	Date	By	Chk	App.

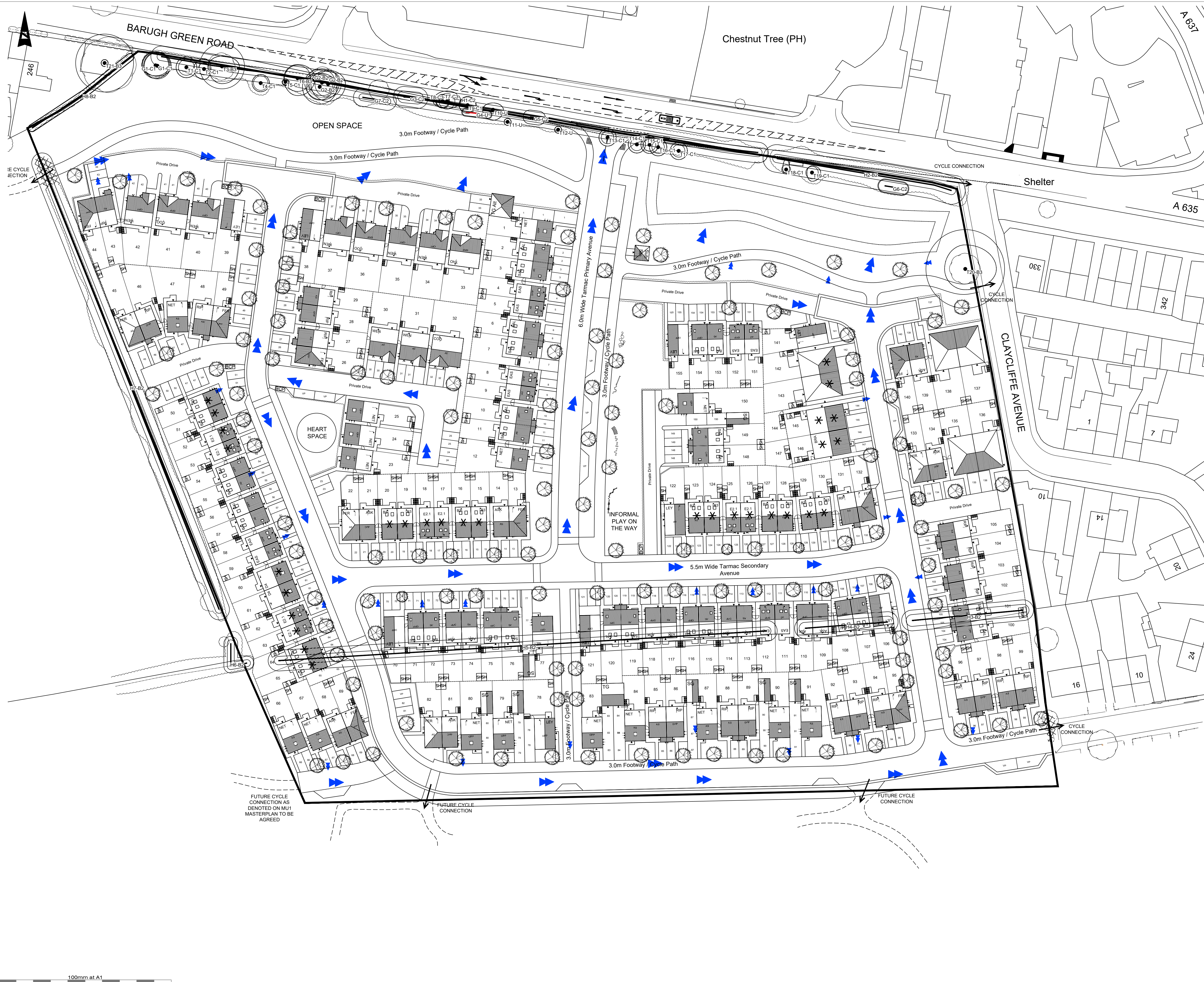


Alan Wood & Partners

Hull Office 341 Beverley Road Hull HU5 1LD	Consulting Civil & Structural Engineers Project Managers Building Surveyors
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Project:	Proposed Scheme at Barugh Green, Barnsley, South Yorkshire				
Client:	Avant Homes				
Drawing:	Existing Surface Water Exceedance				
Role:	Civil Engineer				
Drawing Status:	FOR APPROVAL				Suitability Code: -
Job. no.	51335	Scale@ A1:	1:500	Rev.	P1
Project	Originator	Volume	Level	Type	Role Number
BGB - AWP - ZZ - XX - DR - C - 3401					

100mm at A1



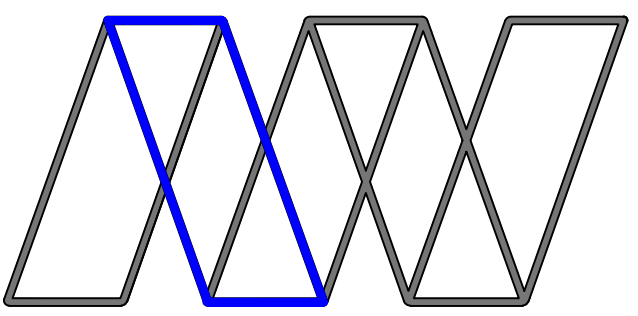
NOTES:

- THESE NOTES ARE INTENDED TO AUGMENT DRAWINGS AND SPECIFICATIONS. WHERE CONFLICT OF REQUIREMENTS EXIST THE ORDER OF PRECEDENCE SHALL BE AS SHOWN IN THE SPECIFICATION. OTHERWISE THE STRICTEST PROVISION SHALL GOVERN.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS AND ARCHITECTS DRAWINGS.
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KEY

▲ = PROPOSED SURFACE WATER EXCEEDANCE FLOW PATH ROUTE

P2	PROPOSED AMENDMENTS	23.12.24	GJ	CM	KH
P1	FIRST ISSUE	04.12.24	HD	SC	—
Rev	Description	Date	By	Chk	App



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T. 01522 300210
T. 01723 865484
T. 01142 440077
T. 01904 611594

Project: Proposed Scheme at Barugh Green, Barnsley, South Yorkshire

Client: Avant Homes

Drawing: Proposed Surface Water Exceedance

Role: Civil Engineer

Drawing Status: **FOR APPROVAL**

Subsidiary Code: -

Job. no. 51335 Scale@ A1 1:500 Rev. P2

Project Originator Volume Level Type Role Number
BGB - AWP - ZZ - XX - DR - C - 3400

APPENDIX I

Existing Drainage CCTV Survey



Project

Project Name: 10192590 - Barugh Green Road

Project Date: 07/04/2020

Inspection Standard: MSCC4 Sewers & Drainage GB (SRM4 Scoring)

CCTV Survey Report

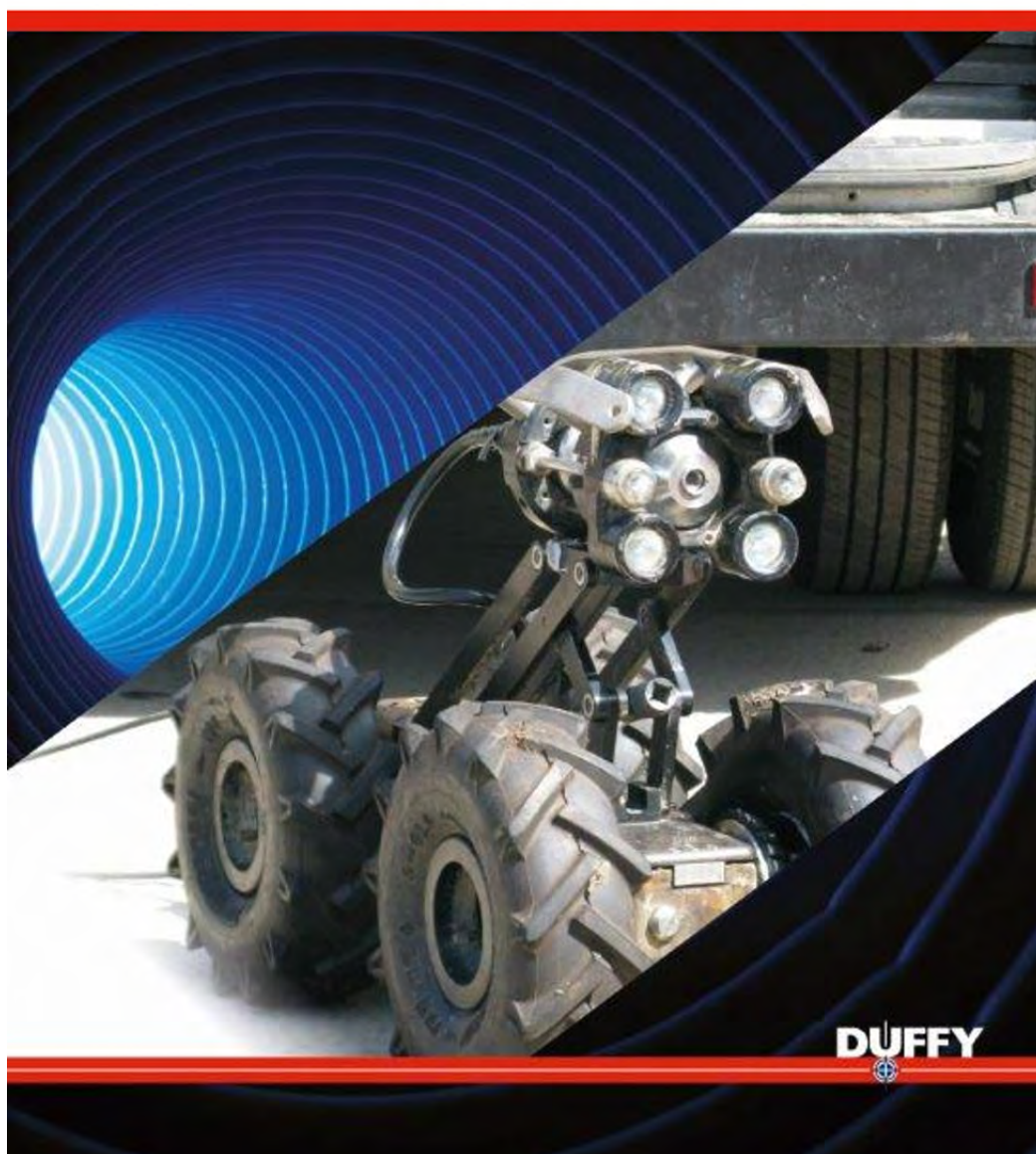


Table of Contents

Project Name	Project Number	Project Date
10192590 - Barugh Green Road		07/04/2020

Project Information	P-1
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Project Pictures	P-3
Defect Grade Description (Section)	P-8
Project Summary	P-9
Section: 1; CW1 > CW2 (CW1X)	1
Section: 2; CW2 > CW3 (CW2X)	2
Section: 3; CW3 > CW4 (CW3X)	4
Section: 4; CW4 > CW5 (CW4X)	5
Section: 5; CW5 > CW6 (CW5X)	6
Section: 6; SW1 > Outlet (SW1X)	7
Section: 7; Inlet > SW1 (InletX)	9
Section: 8; SW2 > SW1 (SW2X)	10
Section: 9; SW3 > SW1 (SW3X)	12
Section: 10; Inlet1 > SW4 (Inlet1X)	14
Section: 11; SW5 > SW6 (SW5X)	16
Section: 12; SW4 > SW5 (SW4X)	17
Section: 13; SW6 > SW7 (SW6X)	19
Section: 14; SW7 > Outlet (SW7X)	20



Project Information

Project Name	Project Number	Project Date
10192590 - Barugh Green Road		07/04/2020

Client

Company: Countryside Properties (uk) Ltd
Contact: Mr Adam Clarke
Street: 3200 Century Way, Thorpe Park
Town or City: Leeds
County: West Yorkshire
Post Code: LS15 8ZB
Phone: 0113 5324484
Mobile: 07468 702603

Site

Company: Countryside Properties (UK) Ltd
Contact: Mr Adam Clarke
Street: Barugh Green Road
Town or City: Barugh Green, Barnsley
County: South Yorkshire
Post Code: S75 1HH
Mobile: 07468 702603

Contractor

Company: DrainsAid
Contact: Mike Booth
Department: CCTV & Desilt supervisor
Street: Connaught House, Park View, Lofthouse Gate
Town or City: Wakefield, WF3 3HA
County: West Yorkshire
Post Code: WF3 3HA
Phone: 0800 0180123
Fax: 01132 365488
Mobile: 07507 816063
Email: m.booth@peterduffyLtd.com

Scoring Summary

Project Name 10192590 - Barugh Green Road	Project Number	Project Date 07/04/2020
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Structural Defects

- Grade 3: Best practice suggests consideration should be given to repairs in the medium term.
- Grade 4: Best practice suggests consideration should be given to repairs to avoid a potential collapse.
- Grade 5: Best practice suggests that this pipe is at risk of collapse at any time. Urgent consideration should be given to repairs to avoid total failure.

Section	PLR	Grade	Description
12	SW4X	4	Hole in drain or sewer from 11 o'clock to 1 o'clock

Service / Operational Condition

- Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.
- Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.
- Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

Section	PLR	Grade	Description
2	CW2X	3	Multiple defects
6	SW1X	4	Settled deposits, other, 30% cross-sectional area loss
9	SW3X	4	Settled deposits, other, 25% cross-sectional area loss
10	Inlet1X	5	Other obstacles from 11 o'clock to 1 o'clock, 5% cross-sectional area loss
13	SW6X	3	Connection defective, connecting pipe is intruding at 10 o'clock, diameter: 225mm, intrusion: 10%

Abandoned Surveys

Section	PLR	Description
6	SW1X	Survey abandoned
7	InletX	Survey abandoned
8	SW2X	Survey abandoned
9	SW3X	Survey abandoned

Information

These scoring summaries are based on the SRM grading from the WRc.

Project Pictures

Project Name	Project Number	Project Date
10192590 - Barugh Green Road		07/04/2020



CW1 UTR Cover Stuck



SW2 UTR Bolted Cover Seized

Project Pictures

Project Name	Project Number	Project Date
10192590 - Barugh Green Road		07/04/2020



CW4 UTR Cover Stuck



SW8 Water Level 100% UTS

Project Pictures

Project Name	Project Number	Project Date
10192590 - Barugh Green Road		07/04/2020



SW8 Location



Mh1 UTS DES 40%

Project Pictures

Project Name	Project Number	Project Date
10192590 - Barugh Green Road		07/04/2020



Mh1 UTS DES 40%_1



Mh2 UTS DES 45%

Project Pictures

Project Name	Project Number	Project Date
10192590 - Barugh Green Road		07/04/2020



Mh2 Location



Mh3 UTR Cover Broken

Defect Grade Description (Section)

Project Name 10192590 - Barugh Green Road	Project Number	Project Date 07/04/2020
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1:	Brick: No structural defects. Pipe: No structural defects. Acceptable structural condition.
2:	Brick: Circumferential cracking; single longitudinal crack; surface mortar loss (depth missing < 15mm); surface damage - slight spalling (breaking away of small fragments from the surface); surface damage - slight wear (increased roughness). Pipe: Circumferential crack; moderate joint defects (i.e. medium open joint or medium displaced joint); surface damage - slight spalling (breaking away of small fragments from the surface) or slight wear (increased roughness). Minimal collapse likelihood in the short term but potential for further deterioration.
3:	Brick: Medium mortar loss (depth missing 15-50mm) without other defects; more than one longitudinal crack (at a single location); multiple cracking; single bricks displaced; deformation < 5%; no fracture and only moderate mortar loss; surface damage - medium spalling (large areas of chipped brick); surface damage - medium wear (large area of brick surface is missing). Pipe: Fracture with no deformation or deformation < 5%; longitudinal cracking or multiple cracking; minor loss of level; severe joint defects (i.e. large open joint or large displaced joint); surface damage - partial area of pipe surface is missing or worn. ! Collapse unlikely in the near future but further deterioration likely !
4:	Brick: Total mortar loss (depth missing > 50mm) with deformation > 10%; deformation up to 10% and fractured; displaced or hanging brickwork; small number of missing bricks; dropped invert (drop > 20mm); moderate loss of level; surface damage - large spalling (entire surface of brick is missing); surface damage - large wear (entire surface of brick is missing). Pipe: Broken; deformation up to 10% and broken; fracture with deformation 5-10%; multiple fractures; serious loss of level; serious joint defects with voids or soil visible (open joint with > 50mm soil or void visible or joint displacement > 25% of diameter); surface damage - entire area of pipe surface is missing or severely worn. !! Collapse likely in the foreseeable future !!
5:	Brick: Already collapsed; missing Invert; deformation > 10% and fractured; displaced or hanging brickwork and deformation < 10%; extensive areas of missing brickwork. Pipe: Already collapsed; deformation > 10% and broken; extensive areas of pipe fabric missing; fractures with deformation > 10% !!! Collapsed or collapse imminent !!!



Project Summary

Project Name 10192590 - Barugh Green Road	Project Number	Project Date 07/04/2020
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Pipe Summary

No.	Type	PLR	Upstream Node	Downstream Node	Road	Town	Use	Mat.	Profile	Length
1	SEC	CW1X	CW1	CW2	Barugh Green Road	Barugh Green	C	CO	Circular 600mm	77.90 m
2	SEC	CW2X	CW2	CW3	Barugh Green Road	Barugh Green	C	CO	Circular 600mm	72.60 m
3	SEC	CW3X	CW3	CW4	Barugh Green Road	Barugh Green	C	CO	Circular 600mm	73.10 m
4	SEC	CW4X	CW4	CW5	Barugh Green Road	Barugh Green	C	CO	Circular 600mm	62.50 m
5	SEC	CW5X	CW5	CW6	Barugh Green Road	Barugh Green	C	CO	Circular 600mm	61.50 m
6	SEC	SW1X	SW1	OUTLET	Barugh Green Road	Barugh Green	W	CO	Circular 525mm	3.00 m
7	SEC	InletX	INLET	SW1	Barugh Green Road	Barugh Green	W	MAR	Rectangular 450/300mm	13.00 m
8	SEC	SW2X	SW2	SW1	Barugh Green Road	Barugh Green	S	VC	Circular 225mm	0.90 m
9	SEC	SW3X	SW3	SW1	Barugh Green Road	Barugh Green	S	VC	Circular 225mm	40.70 m
10	SEC	Inlet1X	INLET1	SW4	Barugh Green Road	Barugh Green	W	CO	Circular 600mm	7.40 m
11	SEC	SW5X	SW5	SW6	Barugh Green Road	Barugh Green	W	CO	Circular 600mm	19.30 m
12	SEC	SW4X	SW4	SW5	Barugh Green Road	Barugh Green	W	CO	Circular 600mm	4.90 m
13	SEC	SW6X	SW6	SW7	Barugh Green Road	Barugh Green	W	CO	Circular 600mm	36.00 m
14	SEC	SW7X	SW7	OUTLET	Barugh Green Road	Barugh Green	W	CO	Circular 600mm	5.10 m
Total:										477.90 m



DrainsAid
 Connaught House, Park View, Lofthouse Gate, Wakefield,
 WF3 3HA
 Tel. 0800 0180123

Project Summary

Project Name 10192590 - Barugh Green Road	Project Number	Project Date 07/04/2020
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Pipe Levels

No.	PLR	Upstream Node	Upstream C.L.	Upstream I.L.	Upstream I.D.	Downstream Node	Downstream C.L.	Downstream I.L.	Downstream I.D.
1	CW1X	CW1			0.000 m	CW2			1.850 m
2	CW2X	CW2			1.850 m	CW3			1.700 m
3	CW3X	CW3			1.700 m	CW4			0.000 m
4	CW4X	CW4			0.000 m	CW5			2.450 m
5	CW5X	CW5			2.450 m	CW6			3.700 m
6	SW1X	SW1			2.100 m	OUTLET			0.000 m
7	InletX	INLET			0.000 m	SW1			2.100 m
8	SW2X	SW2			0.000 m	SW1			2.100 m
9	SW3X	SW3			0.000 m	SW1			2.100 m
10	Inlet1X	INLET1			0.000 m	SW4			2.600 m
11	SW5X	SW5			0.000 m	SW6			2.340 m
12	SW4X	SW4			2.600 m	SW5			0.000 m
13	SW6X	SW6			2.340 m	SW7			0.000 m
14	SW7X	SW7			0.000 m	OUTLET			0.000 m

Pipe Summary by Profile

Profile	Total Length	No. Pipes
Circular 225mm	0.90 m	
Circular 225mm	40.70 m	
Circular 225mm =	41.60 m	2
Circular 525mm	3.00 m	
Circular 525mm =	3.00 m	1
Circular 600mm	77.90 m	
Circular 600mm	72.60 m	
Circular 600mm	73.10 m	
Circular 600mm	62.50 m	
Circular 600mm	61.50 m	
Circular 600mm	7.40 m	
Circular 600mm	19.30 m	
Circular 600mm	4.90 m	
Circular 600mm	36.00 m	
Circular 600mm	5.10 m	



Project Summary

Project Name 10192590 - Barugh Green Road	Project Number	Project Date 07/04/2020
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Profile	Total Length	No. Pipes
Circular 600mm =	420.30 m	10
Rectangular 450/300mm	13.00 m	
Rectangular 450/300mm =	13.00 m	1
Total =	477.90 m	14

Inspection Summary

Pipe No.	Insp. No.	Upstream Node	Downstream Node	Dir.	Operator	Insp. Date	Insp. Time	Str	Ser	Final Observation	Length
1	1	CW1	CW2	US	C.Chilton	07/04/2020	20:40	1	1	MHF	77.90 m
2	1	CW2	CW3	DS	C.Chilton	07/04/2020	21:01	3	1	MHF	72.60 m
3	1	CW3	CW4	DS	C.Chilton	07/04/2020	21:16	1	1	MHF	73.10 m
4	1	CW4	CW5	DS	C.Chilton	07/04/2020	22:59	1	1	MHF	62.50 m
5	1	CW5	CW6	DS	C.Chilton	07/04/2020	23:05	1	1	MHF	61.50 m
6	1	SW1	OUTLET	DS	C.Chilton	07/04/2020	23:43	4	1	SA, DEX 30%	3.00 m
7	1	INLET	SW1	US	C.Chilton	08/04/2020	0:30	1	1	SA, SCR	0.40 m
8	1	SW2	SW1	US	C.Chilton	08/04/2020	0:36	5	1	SA, RTJ	0.90 m
9	1	SW3	SW1	US	C.Chilton	08/04/2020	0:43	4	1	SA, DEX 20% Mud	40.70 m
10	1	INLET1	SW4	US	C.Chilton	08/04/2020	20:28	5	1	OFF	7.40 m
11	1	SW5	SW6	US	C.Chilton	08/04/2020	20:52	1	1	MHF, Buried Possible Blind Chamber	19.30 m
12	1	SW4	SW5	US	C.Chilton	08/04/2020	21:00	1	4	CPF	4.90 m
13	1	SW6	SW7	DS	C.Chilton	08/04/2020	22:15	3	1	MHF, Buried Possible Blind Chamber	36.00 m
14	1	SW7	OUTLET	DS	C.Chilton	08/04/2020	22:24	1	1	OFF	5.10 m
Total:											465.30 m

Inspection Summary by Profile

Profile	Total Length	No. Inspections
Circular 225mm	0.90 m	
Circular 225mm	40.70 m	
Circular 225mm =	41.60 m	2
Circular 525mm	3.00 m	

Project Summary

Project Name 10192590 - Barugh Green Road	Project Number	Project Date 07/04/2020
---	-----------------------	-----------------------------------

Profile	Total Length	No. Inspections
Circular 525mm =	3.00 m	1
Circular 600mm	77.90 m	
Circular 600mm	72.60 m	
Circular 600mm	73.10 m	
Circular 600mm	62.50 m	
Circular 600mm	61.50 m	
Circular 600mm	7.40 m	
Circular 600mm	19.30 m	
Circular 600mm	4.90 m	
Circular 600mm	36.00 m	
Circular 600mm	5.10 m	
Circular 600mm =	420.30 m	10
Rectangular 450/300mm	0.40 m	
Rectangular 450/300mm =	0.40 m	1
Total =	465.30 m	14

Defect Summary				CCTV Drainage Survey Observation Count																				
				General				Structural Condition								Service Condition								
Sect. No.	Insp. No.	Upstream Node	Downstream Node	Insp. Length (m)	No. Grade 4/5 Obs.	Survey Abandoned	Camera Under Water	Cracks	Fractures	Broken	Deformed	Collapsed	Holes	Surface Damage	Displaced Joints	Open Joints	Roots	Infiltration	Encrustation	Silt	Grease	Obstruction	Water Level	Line Deviates
1	1	CW1	CW2	77.9																			1	
2	1	CW2	CW3	72.6																			1	
3	1	CW3	CW4	73.1																			1	
4	1	CW4	CW5	62.5																			1	
5	1	CW5	CW6	61.5																			2	
6	1	SW1	OUTLET	3.0		1																	1	
7	1	INLET	SW1	0.4		1																	1	
8	1	SW2	SW1	0.9	1	1											1						1	
9	1	SW3	SW1	40.7		1																	1	
10	1	INLET1	SW4	7.4	1													1				1	1	



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WF3 3HA
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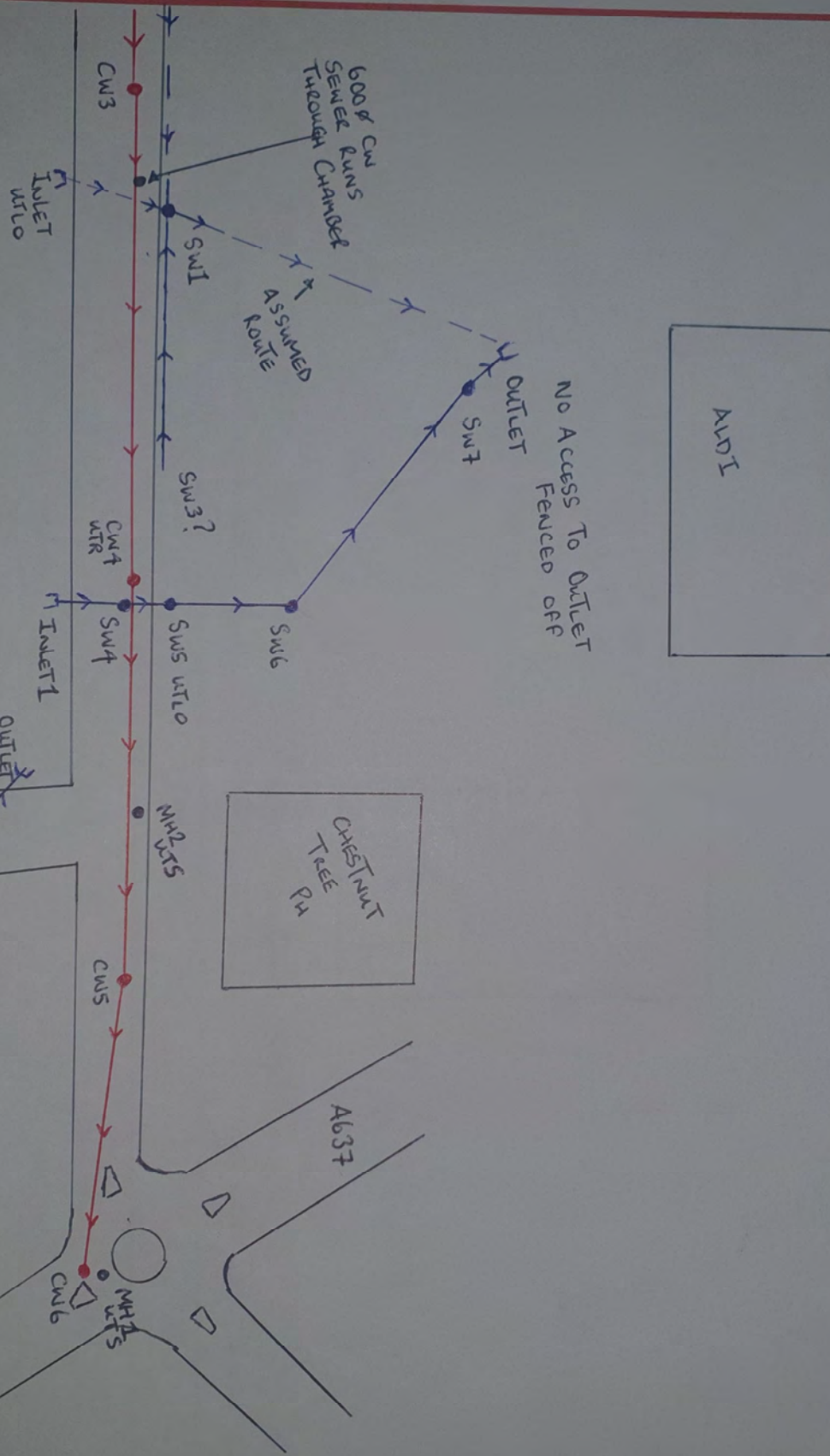
Project Summary

Project Name 10192590 - Barugh Green Road	Project Number	Project Date 07/04/2020
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Sect. No.	Insp. No.	Upstream Node	Downstream Node	Insp. Length (m)	No. Grade 4/5 Obs.	Survey Abandoned	Camera Under Water	Cracks	Fractures	Broken	Deformed	Collapsed	Holes	Surface Damage	Displaced Joints	Open Joints	Roots	Infiltration	Encrustation	Silt	Grease	Obstruction	Water Level	Line Deviates
11	1	SW5	SW6	19.3																			1	
12	1	SW4	SW5	4.9	1								1										1	
13	1	SW6	SW7	36.0																			1	1
14	1	SW7	OUTLET	5.1																			1	
Total:				465.3	3	4											1	1				1	15	1

DrainsAid

First Aid For All Your Drains

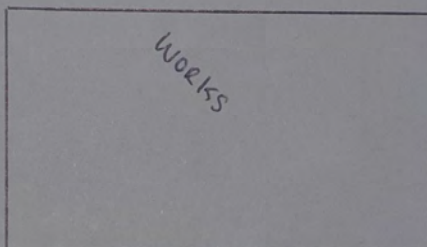
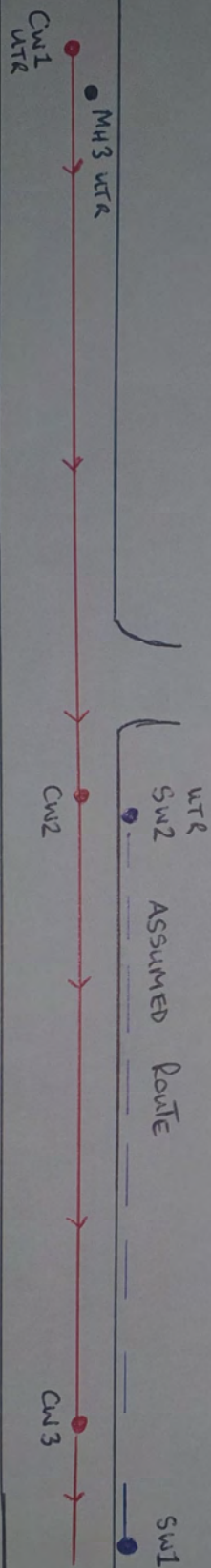


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E-mail: info@drains-aid.com

246



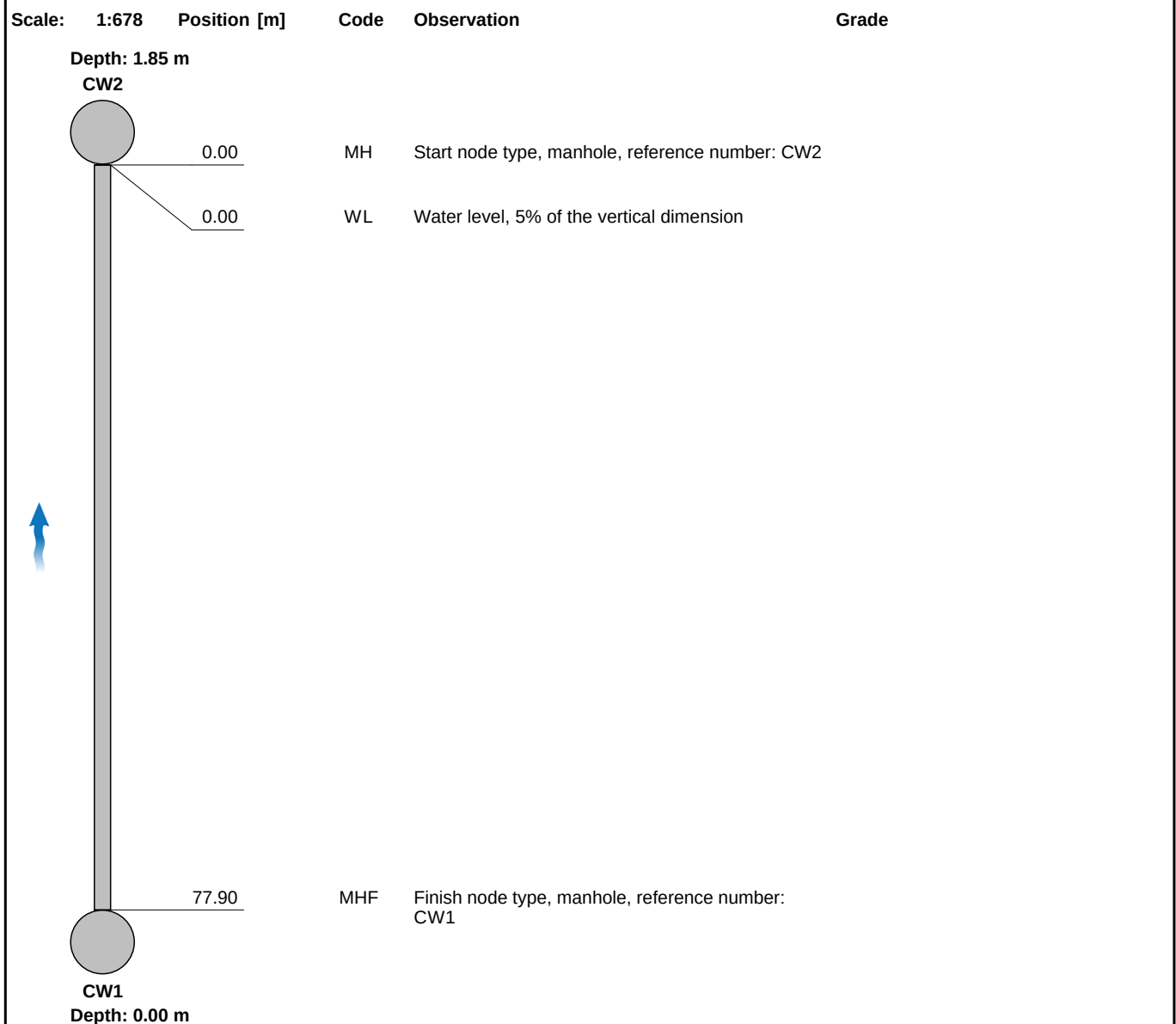
Section Inspection - 07/04/2020 - CW1X

Section 1	Inspection 1	Date 07/04/20	Time 20:40	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR CW1X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 1.30 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Upstream	Upstream Node:	CW1
Road:	Barugh Green Road	Inspected Length:	77.90 m	Upstream Pipe Depth:	0.000 m
Location:	Road	Total Length:	77.90 m	Downstream Node:	CW2
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	1.850 m
Use:	Combined	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	600 mm		
Year Constructed:		Pipe Material:	Concrete		
Flow Control:	No flow control	Lining Type:	No Lining		
Inspection Purpose:	Sample survey to determine asset condition	Lining Material:	No Lining		

Comments:

Recommendations:



STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

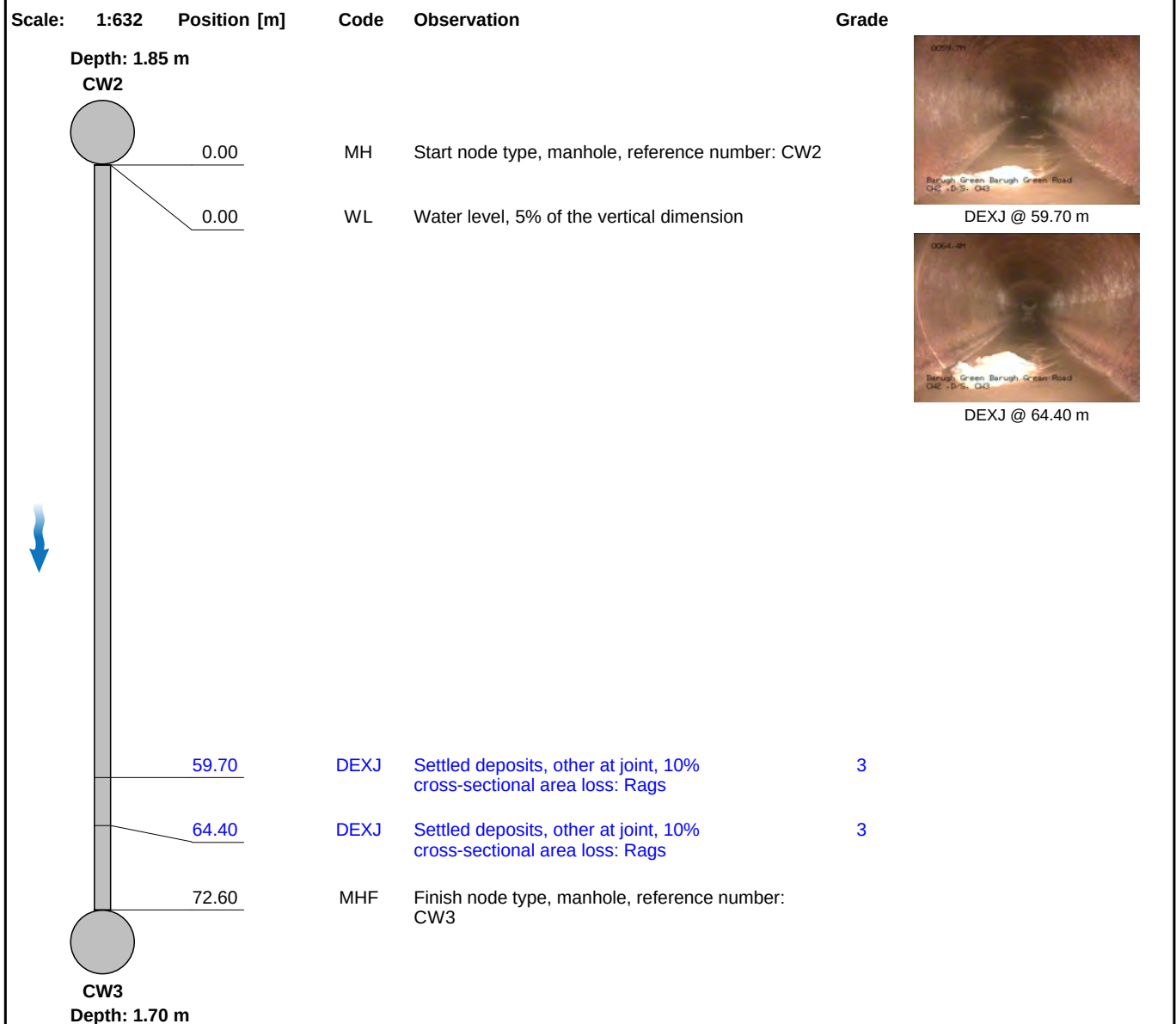
Section Inspection - 07/04/2020 - CW2X

Section 2	Inspection 2	Date 07/04/20	Time 21:01	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR CW2X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 1.30 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Downstream	Upstream Node:	CW2
Road:	Barugh Green Road	Inspected Length:	72.60 m	Upstream Pipe Depth:	1.850 m
Location:	Road	Total Length:	72.60 m	Downstream Node:	CW3
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	1.700 m
Use:	Combined	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	600 mm		
Year Constructed:		Pipe Material:	Concrete		
Flow Control:	No flow control	Lining Type:	No Lining		
Inspection Purpose:	Sample survey to determine asset condition	Lining Material:	No Lining		

Comments:

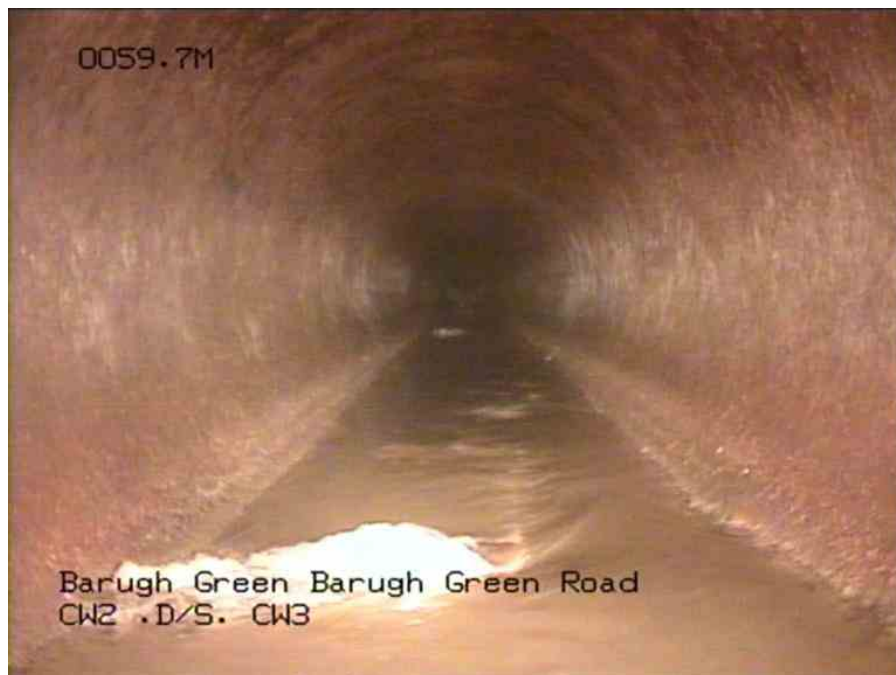
Recommendations:



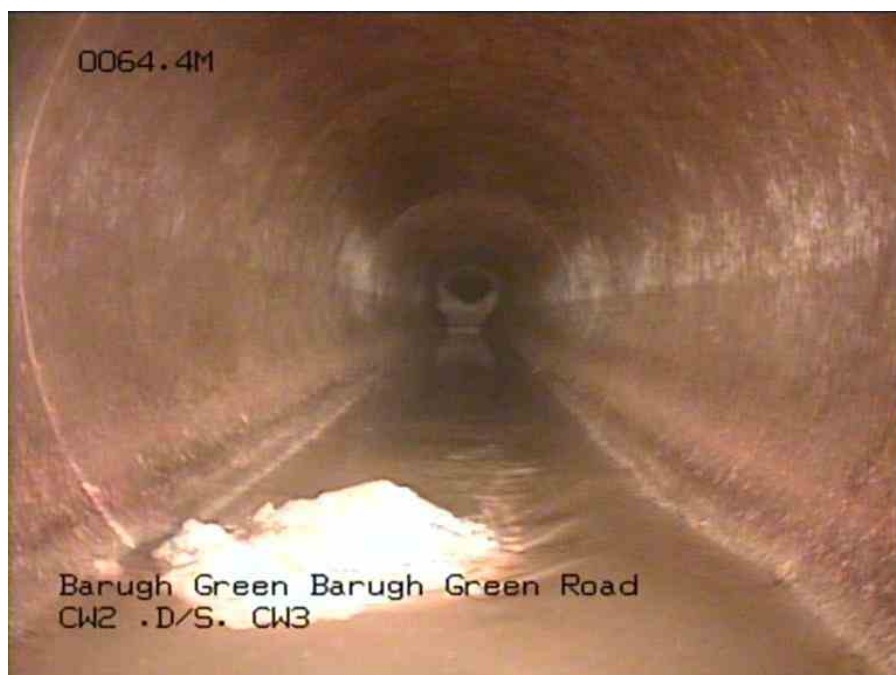
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	2	2.0	0.1	4.0	3.0

Section Pictures - 07/04/2020 - CW2X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Downstream	CW2X		10192590



1, 00:03:22, 59.70 m
 Settled deposits, other at joint, 10% cross-sectional area loss, Rags



2, 00:03:42, 64.40 m
 Settled deposits, other at joint, 10% cross-sectional area loss, Rags

Section Inspection - 07/04/2020 - CW3X

Section 3	Inspection 3	Date 07/04/20	Time 21:16	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR CW3X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 0.00 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Downstream	Upstream Node:	CW3
Road:	Barugh Green Road	Inspected Length:	73.10 m	Upstream Pipe Depth:	1.700 m
Location:	Road	Total Length:	73.10 m	Downstream Node:	CW4
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	0.000 m
Use:	Combined		Pipe Shape:	Circular	
Type of Pipe:	Gravity drain/sewer		Dia/Height:	600 mm	
Year Constructed:			Pipe Material:	Concrete	
Flow Control:	No flow control		Lining Type:	No Lining	
Inspection Purpose:	Sample survey to determine asset condition		Lining Material:	No Lining	
Comments:	UTR CW4 Cover Stuck				
Recommendations:					

Scale: 1:636 Position [m] Code Observation Grade

Depth: 1.70 m
CW3

0.00

0.00

MH Start node type, manhole, reference number: CW3

WL Water level, 5% of the vertical dimension

73.10

MHF Finish node type, manhole, reference number: CW4

CW4
Depth: 0.00 m

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

Section Inspection - 07/04/2020 - CW4X

Section 4	Inspection 4	Date 07/04/20	Time 22:59	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR CW4X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 0.00 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Downstream	Upstream Node:	CW4
Road:	Barugh Green Road	Inspected Length:	62.50 m	Upstream Pipe Depth:	0.000 m
Location:	Road	Total Length:	62.50 m	Downstream Node:	CW5
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	2.450 m
Use:	Combined		Pipe Shape:	Circular	
Type of Pipe:	Gravity drain/sewer		Dia/Height:	600 mm	
Year Constructed:			Pipe Material:	Concrete	
Flow Control:	No flow control		Lining Type:	No Lining	
Inspection Purpose:	Sample survey to determine asset condition		Lining Material:	No Lining	
Comments:	UTR CW4 Cover Stuck				
Recommendations:					

Scale: 1:544 Position [m] Code Observation Grade

Depth: 0.00 m
CW4

0.00 MH Start node type, manhole, reference number: CW4

0.00 WL Water level, 5% of the vertical dimension

6.60 CN Connection other than junction at 11 o'clock, diameter: 150mm

62.50 MHF Finish node type, manhole, reference number: CW5

Depth: 2.45 m
CW5

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

Section Inspection - 07/04/2020 - CW5X

Section 5	Inspection 5	Date 07/04/20	Time 23:05	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR CW5X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 0.00 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Downstream	Upstream Node:	CW5
Road:	Barugh Green Road	Inspected Length:	61.50 m	Upstream Pipe Depth:	2.450 m
Location:	Road	Total Length:	61.50 m	Downstream Node:	CW6
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	3.700 m
Use:	Combined	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	600 mm		
Year Constructed:		Pipe Material:	Concrete		
Flow Control:	No flow control	Lining Type:	No Lining		
Inspection Purpose:	Sample survey to determine asset condition	Lining Material:	No Lining		

Comments:

Recommendations:

Scale: 1:535 **Position [m]** **Code** **Observation** **Grade**

Depth: 2.45 m
CW5



0.00

MH

Start node type, manhole, reference number: CW5

0.00

WL

Water level, 5% of the vertical dimension



52.80

WL

Water level, 10% of the vertical dimension

61.50

MHF

Finish node type, manhole, reference number: CW6



CW6
Depth: 3.70 m

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

Section Inspection - 07/04/2020 - SW1X

Section 6	Inspection 6	Date 07/04/20	Time 23:43	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW1X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 1.30 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Downstream	Upstream Node:	SW1
Road:	Barugh Green Road	Inspected Length:	3.00 m	Upstream Pipe Depth:	2.100 m
Location:	A footway beside a road	Total Length:	3.00 m	Downstream Node:	OUTLET
Surface Type:	Asphalt Footway	Joint Length:	2.50 m	Downstream Pipe Depth:	0.000 m
Use:	Culverted watercourse			Pipe Shape:	Circular
Type of Pipe:	Gravity drain/sewer			Dia/Height:	525 mm
Year Constructed:				Pipe Material:	Concrete
Flow Control:	No flow control			Lining Type:	No Lining
Inspection Purpose:	Sample survey to determine asset condition			Lining Material:	No Lining

Comments:

Recommendations:

Scale: 1:50 Position [m] Code Observation Grade

Depth: 2.10 m
SW1



0.00

MH

Start node type, manhole, reference number: SW1

0.00

WL

Water level, 5% of the vertical dimension

1.30

SCR

Shape changes to rectangular, new sizes, 600mm high, 500mm wide

1.30

MCMAR

Material changes to masonry (randomly coursed)

2.50

DEX

Settled deposits, other, 30% cross-sectional area loss: Mud

4

3.00

SA

Survey abandoned: DEX 30%



DEX @ 2.50 m

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	1	5.0	2.0	5.0	4.0

Section Pictures - 07/04/2020 - SW1X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
6	Downstream	SW1X		10192590



0002 - SM

Barugh Green Barugh Green Road
 SW1 D/S. Outlet

1, 00:00:54, 2.50 m
 Settled deposits, other, 30% cross-sectional area loss, Mud

Section Inspection - 08/04/2020 - InletX

Section 7	Inspection 7	Date 08/04/20	Time 0:30	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR INLETX
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 1.00 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Upstream	Upstream Node:	INLET
Road:	Barugh Green Road	Inspected Length:	0.40 m	Upstream Pipe Depth:	0.000 m
Location:	A footway beside a road	Total Length:	13.00 m	Downstream Node:	SW1
Surface Type:	Asphalt Footway	Joint Length:	0.00 m	Downstream Pipe Depth:	2.100 m
Use:	Culverted watercourse			Pipe Shape:	Rectangular
Type of Pipe:	Gravity drain/sewer			Dia/Height:	450 mm Width: 300 mm
Year Constructed:				Pipe Material:	Masonry (randomly coursed)
Flow Control:	No flow control			Lining Type:	No Lining
Inspection Purpose:	Sample survey to determine asset condition			Lining Material:	No Lining

Comments:

Recommendations:

Scale: 1:114

Position [m]

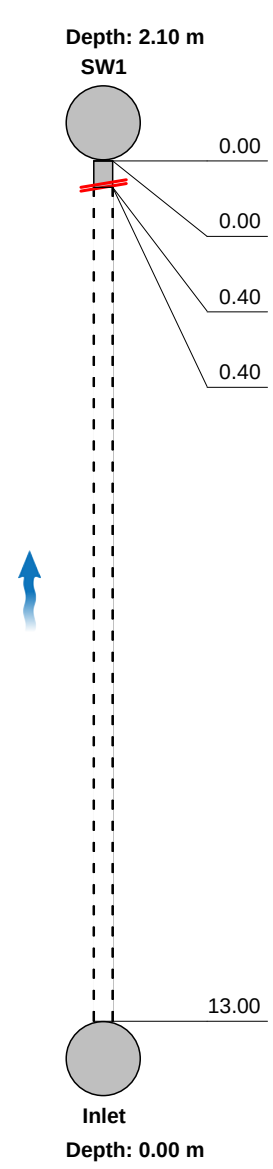
Code

Observation

Grade

Depth: 2.10 m

SW1



Position [m]	Code	Observation
0.00	MH	Start node type, manhole, reference number: SW1
0.00	WL	Water level, 5% of the vertical dimension
0.40	SCR	Shape changes to rectangular, new sizes, 150mm high, 300mm wide
0.40	SA	Survey abandoned: SCR

13.00

End of pipe

Inlet

Depth: 0.00 m

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

Section Inspection - 08/04/2020 - SW2X

Section 8	Inspection 8	Date 08/04/20	Time 0:36	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW2X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 1.00 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Upstream	Upstream Node:	SW2
Road:	Barugh Green Road	Inspected Length:	0.90 m	Upstream Pipe Depth:	0.000 m
Location:	A footway beside a road	Total Length:	0.90 m	Downstream Node:	SW1
Surface Type:	Asphalt Footway	Joint Length:	1.00 m	Downstream Pipe Depth:	2.100 m
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	225 mm		
Year Constructed:		Pipe Material:	Vitrified clay pipe (i.e. all clayware)		
Flow Control:	No flow control	Lining Type:	No Lining		
Inspection Purpose:	Sample survey to determine asset condition	Lining Material:	No Lining		

Comments:

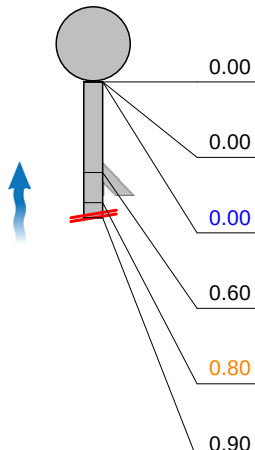
Recommendations:

Scale:1:50

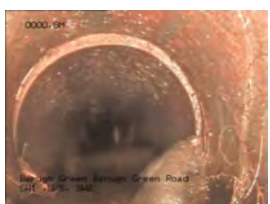
Position [m]

Depth: 2.10 m

SW1



0.00	MH	Start node type, manhole, reference number: SW1	
0.00	WL	Water level, 5% of the vertical dimension	
0.00	DEX	Settled deposits, other, 20% cross-sectional area loss: Mud	3
0.60	JN	Junction at 10 o'clock, diameter: 150mm	
0.80	RTJ	Roots, tap at joint	4
0.90	SA	Survey abandoned: RTJ	



RTJ @ 0.80 m

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	2	5.0	8.8	7.0	5.0

Section Pictures - 08/04/2020 - SW2X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
8	Upstream	SW2X		10192590



1, 00:01:10, 0.80 m
 Roots, tap at joint

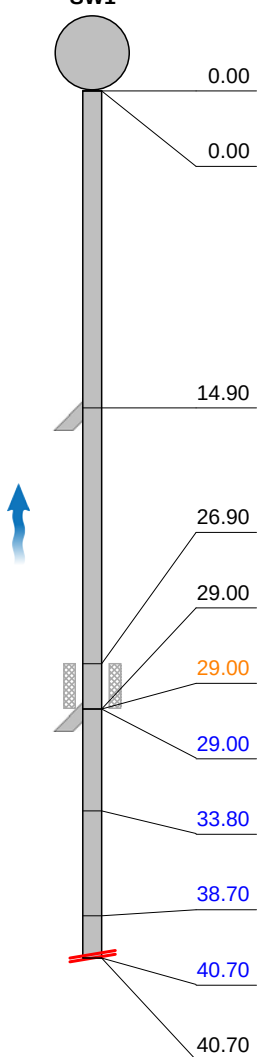
Section Inspection - 08/04/2020 - SW3X

Section 9	Inspection 9	Date 08/04/20	Time 0:43	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW3X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 1.00 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Upstream	Upstream Node:	SW3
Road:	Barugh Green Road	Inspected Length:	40.70 m	Upstream Pipe Depth:	
Location:	A footway beside a road	Total Length:	40.70 m	Downstream Node:	SW1
Surface Type:	Asphalt Footway	Joint Length:	1.00 m	Downstream Pipe Depth:	2.100 m
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	225 mm		
Year Constructed:		Pipe Material:	Vitrified clay pipe (i.e. all clayware)		
Flow Control:	No flow control	Lining Type:	No Lining		
Inspection Purpose:	Sample survey to determine asset condition	Lining Material:	No Lining		

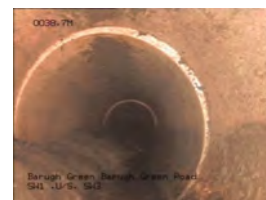
Comments:

Recommendations:

Scale: 1:354	Position [m]	Code	Observation	Grade
Depth: 2.10 m SW1				
				
	0.00	MH	Start node type, manhole, reference number: SW1	
	0.00	WL	Water level, 5% of the vertical dimension	
	14.90	CN	Connection other than junction at 2 o'clock, diameter: 150mm	
	26.90	S01	DEX Settled deposits, other, 15% cross-sectional area loss, start: Mud	
	29.00	CN	Connection other than junction at 2 o'clock, diameter: 150mm	
	29.00	DEX	Settled deposits, other, 25% cross-sectional area loss: Mud	4
	29.00	F01	DEX Settled deposits, other, 15% cross-sectional area loss, finish: Mud	3
	33.80	DEX	Settled deposits, other, 10% cross-sectional area loss: Mud	3
	38.70	DEX	Settled deposits, other, 20% cross-sectional area loss: Mud	3
	40.70	DEX	Settled deposits, other, 20% cross-sectional area loss: Mud	3
	40.70	SA	Survey abandoned: DEX 20% Mud	



DEX @ 26.90 m



DEX @ 38.70 m

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	5	7.0	0.4	17.0	4.0

Section Pictures - 08/04/2020 - SW3X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
9	Upstream	SW3X		10192590



1, 00:03:00, 26.90 m
Settled deposits, other, 15% cross-sectional area loss, start, Mud



2, 00:05:35, 38.70 m
Settled deposits, other, 20% cross-sectional area loss, Mud

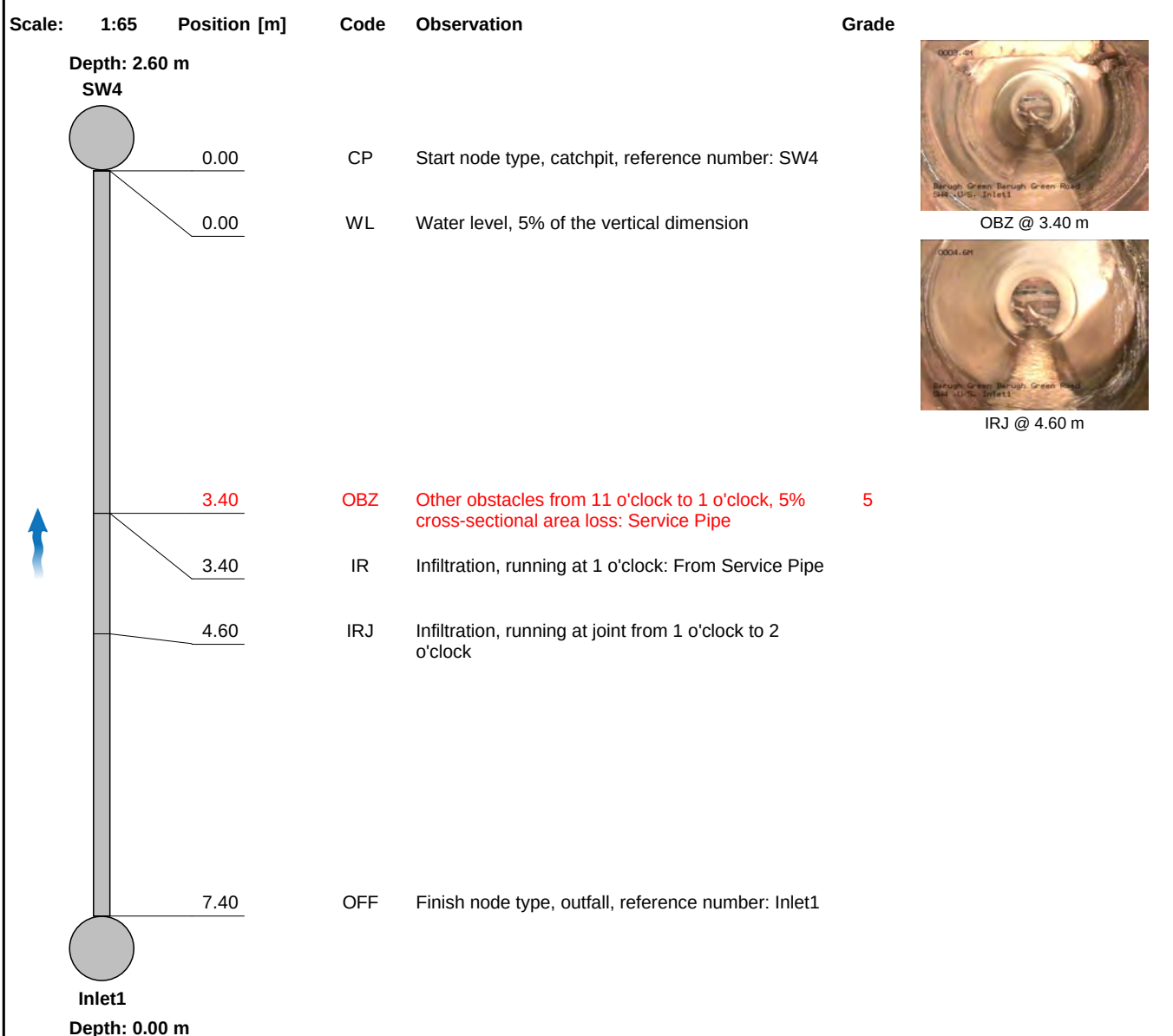
Section Inspection - 08/04/2020 - Inlet1X

Section 10	Inspection 10	Date 08/04/20	Time 20:28	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR INLET1X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 1.30 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Upstream	Upstream Node:	INLET1
Road:	Barugh Green Road	Inspected Length:	7.40 m	Upstream Pipe Depth:	0.000 m
Location:	Road	Total Length:	7.40 m	Downstream Node:	SW4
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	2.600 m
Use:	Culverted watercourse			Pipe Shape:	Circular
Type of Pipe:	Gravity drain/sewer			Dia/Height:	600 mm
Year Constructed:				Pipe Material:	Concrete
Flow Control:	No flow control			Lining Type:	No Lining
Inspection Purpose:	Sample survey to determine asset condition			Lining Material:	No Lining

Comments:

Recommendations:



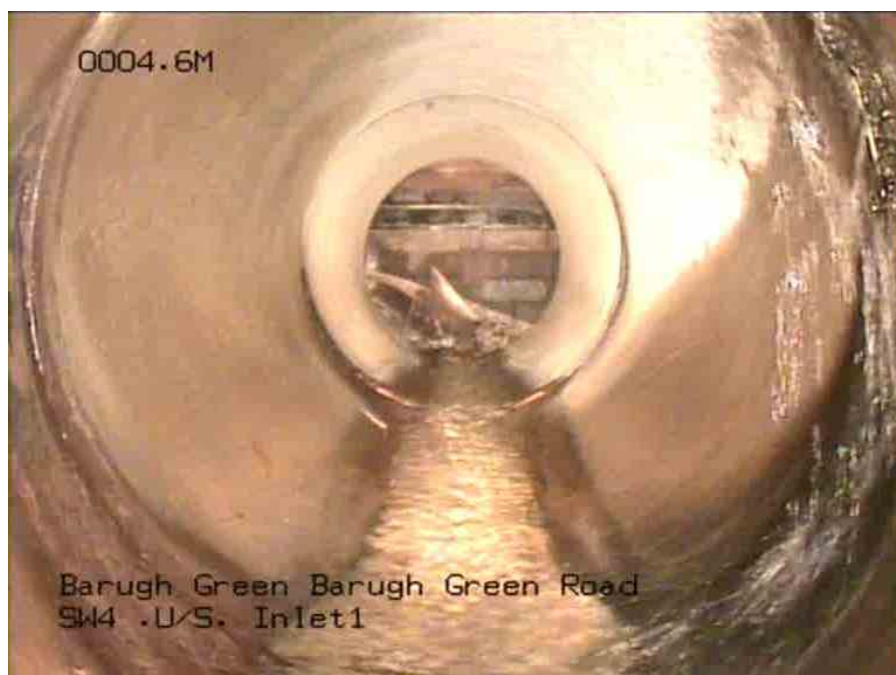
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	1	10.0	2.2	10.0	5.0

Section Pictures - 08/04/2020 - Inlet1X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
10	Upstream	INLET1X		10192590



1, 00:00:47, 3.40 m
Other obstacles from 11 o'clock to 1 o'clock, 5% cross-sectional area loss, Service Pipe



2, 00:01:03, 4.60 m
Infiltration, running at joint from 1 o'clock to 2 o'clock

Section Inspection - 08/04/2020 - SW5X

Section 11	Inspection 11	Date 08/04/20	Time 20:52	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW5X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 1.30 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Upstream	Upstream Node:	SW5
Road:	Barugh Green Road	Inspected Length:	19.30 m	Upstream Pipe Depth:	0.000 m
Location:	Road	Total Length:	19.30 m	Downstream Node:	SW6
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	2.340 m
Use:	Culverted watercourse			Pipe Shape:	Circular
Type of Pipe:	Gravity drain/sewer			Dia/Height:	600 mm
Year Constructed:				Pipe Material:	Concrete
Flow Control:	No flow control			Lining Type:	No Lining
Inspection Purpose:	Sample survey to determine asset condition			Lining Material:	No Lining

Comments:

Recommendations:

Scale: 1:168 Position [m] Code Observation Grade

Depth: 2.34 m
SW6



0.00

MH

Start node type, manhole, reference number: SW6

0.00

WL

Water level, 5% of the vertical dimension

19.30

MHF

Finish node type, manhole, reference number:
SW5: Buried Possible Blind Chamber

SW5
Depth: 0.00 m

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

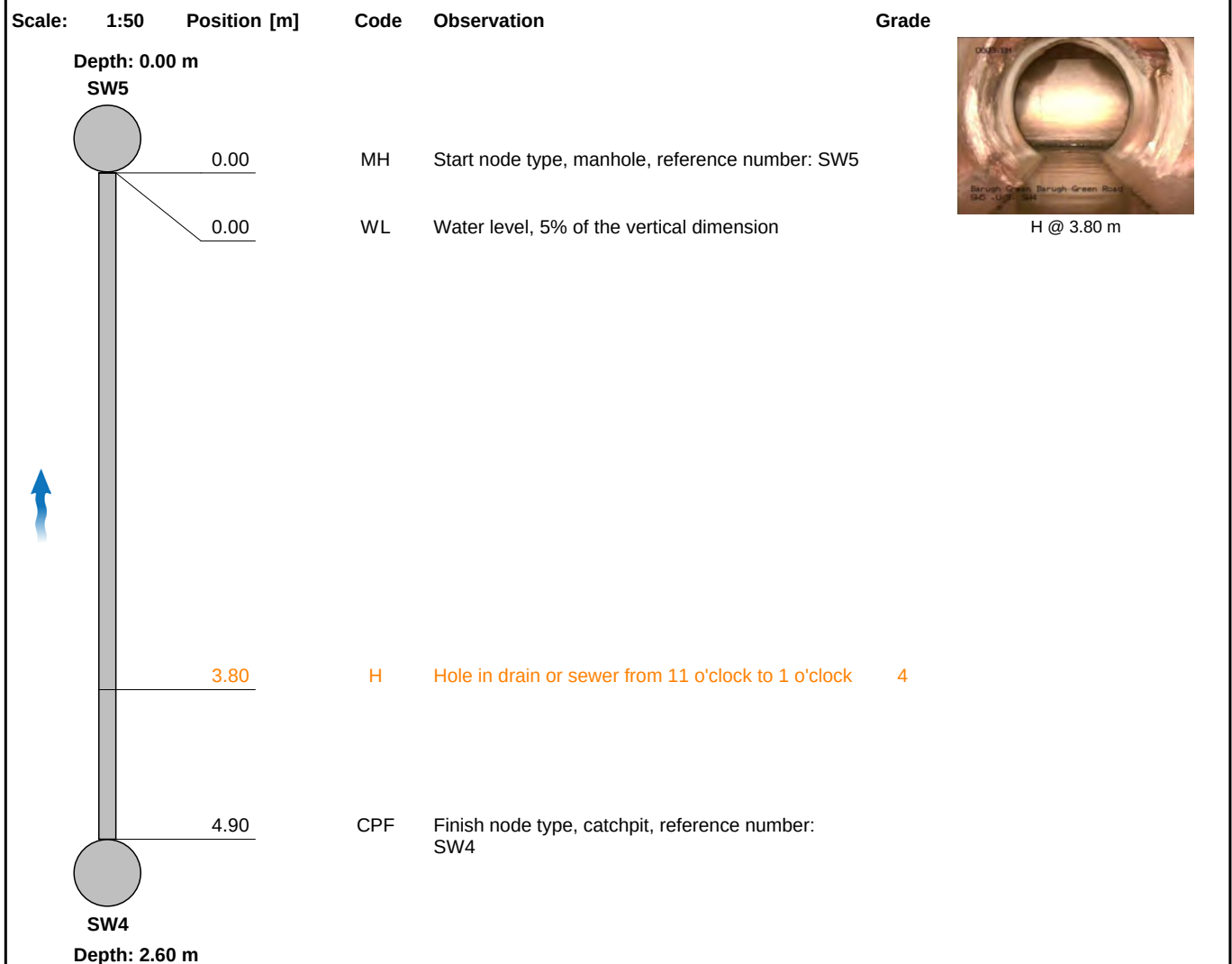
Section Inspection - 08/04/2020 - SW4X

Section 12	Inspection 12	Date 08/04/20	Time 21:00	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW4X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 0.00 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Upstream	Upstream Node:	SW4
Road:	Barugh Green Road	Inspected Length:	4.90 m	Upstream Pipe Depth:	2.600 m
Location:	Road	Total Length:	4.90 m	Downstream Node:	SW5
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	0.000 m
Use:	Culverted watercourse			Pipe Shape:	Circular
Type of Pipe:	Gravity drain/sewer			Dia/Height:	600 mm
Year Constructed:				Pipe Material:	Concrete
Flow Control:	No flow control			Lining Type:	No Lining
Inspection Purpose:	Sample survey to determine asset condition			Lining Material:	No Lining

Comments:

Recommendations:



STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
1	80.0	21.1	80.0	4.0	0	0.0	0.0	0.0	1.0

Section Pictures - 08/04/2020 - SW4X

Section	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
12	Upstream	SW4X		10192590



1, 00:00:31, 3.80 m
 Hole in drain or sewer from 11 o'clock to 1 o'clock

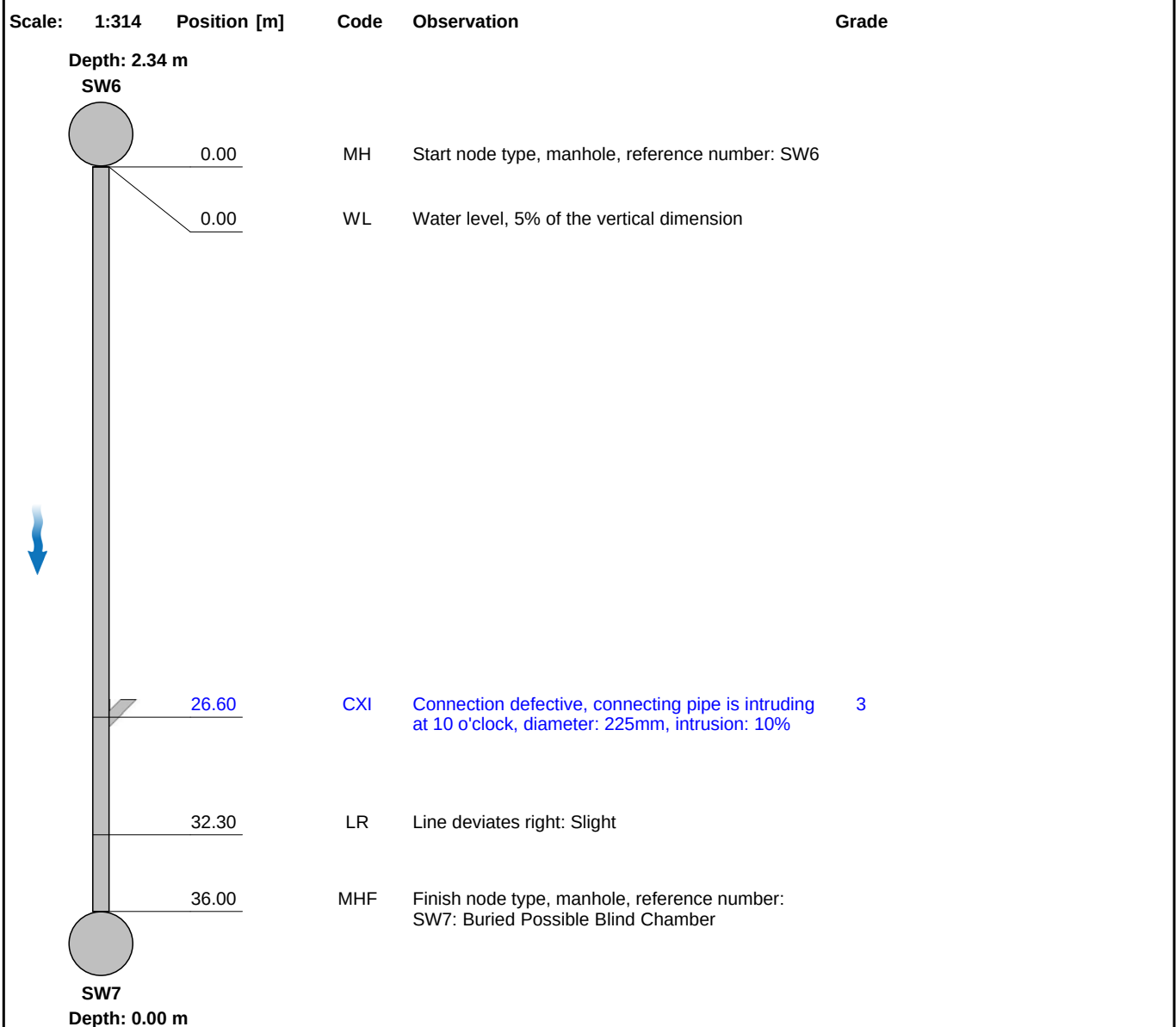
Section Inspection - 08/04/2020 - SW6X

Section 13	Inspection 13	Date 08/04/20	Time 22:15	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW6X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 1.30 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Downstream	Upstream Node:	SW6
Road:	Barugh Green Road	Inspected Length:	36.00 m	Upstream Pipe Depth:	2.340 m
Location:	Road	Total Length:	36.00 m	Downstream Node:	SW7
Surface Type:	Asphalt Highway	Joint Length:	2.50 m	Downstream Pipe Depth:	0.000 m
Use:	Culverted watercourse			Pipe Shape:	Circular
Type of Pipe:	Gravity drain/sewer			Dia/Height:	600 mm
Year Constructed:				Pipe Material:	Concrete
Flow Control:	No flow control			Lining Type:	No Lining
Inspection Purpose:	Sample survey to determine asset condition			Lining Material:	No Lining

Comments:

Recommendations:



STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	1	2.0	0.1	2.0	3.0

Section Inspection - 08/04/2020 - SW7X

Section 14	Inspection 14	Date 08/04/20	Time 22:24	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR SW7X
Operator C.Chilton		Vehicle YD13 JZC		Camera Forward Facing	Preset Length 0.00 m	Legal Status Public Sewer	Alternative ID Not Specified

Town or Village:	Barugh Green	Inspection Direction:	Downstream	Upstream Node:	SW7
Road:	Barugh Green Road	Inspected Length:	5.10 m	Upstream Pipe Depth:	0.000 m
Location:	Verge	Total Length:	5.10 m	Downstream Node:	OUTLET
Surface Type:	Grass	Joint Length:	2.50 m	Downstream Pipe Depth:	0.000 m
Use:	Culverted watercourse			Pipe Shape:	Circular
Type of Pipe:	Gravity drain/sewer			Dia/Height:	600 mm
Year Constructed:				Pipe Material:	Concrete
Flow Control:	No flow control			Lining Type:	No Lining
Inspection Purpose:	Sample survey to determine asset condition			Lining Material:	No Lining

Comments:

Recommendations:

Scale: 1:50 Position [m] Code Observation Grade

Depth: 0.00 m

SW7



0.00

MH

Start node type, manhole, reference number: SW7

0.00

WL

Water level, 5% of the vertical dimension



5.10

OFF

Finish node type, outfall, reference number: Outlet

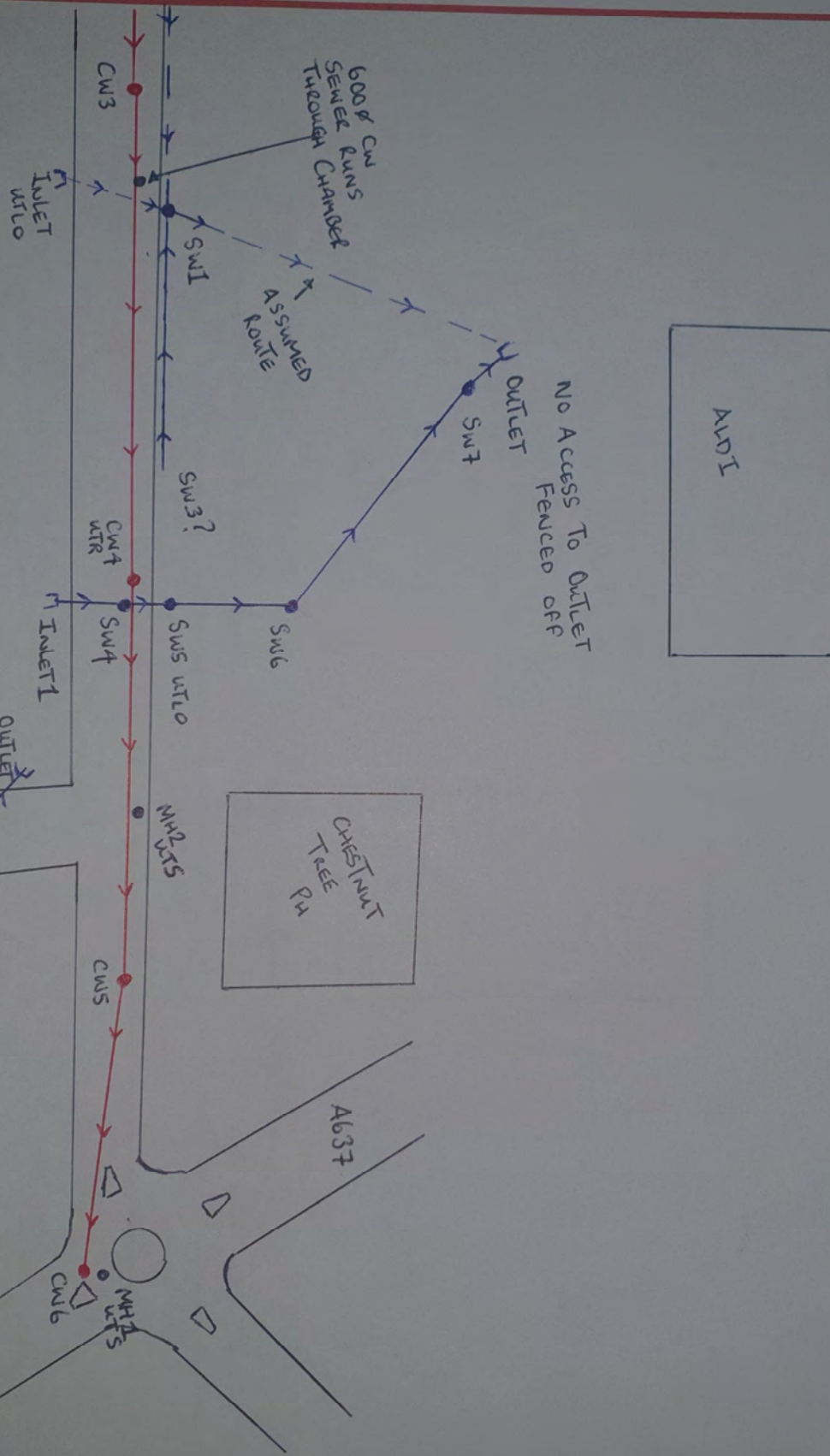
Outlet

Depth: 0.00 m

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

DrainsAid

First Aid For All Your Drains

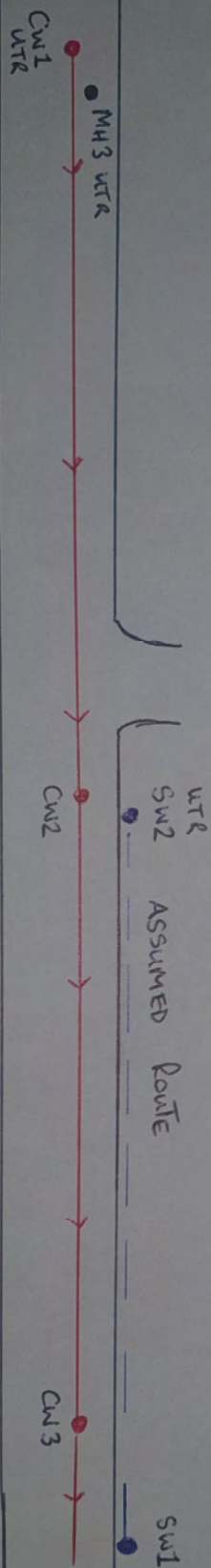


DrainsAid

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