PAP/2025/0155

Richborough

Land north of Orton Road, Warton

Flood Risk Assessment

LE25058–OR-LINK-GEN-XX-RP-C-FRA01_Flood Risk Assessment

March 2025

linkeng.co.uk

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PROJECT NO:

LE25058

DATE:

March 2025

REPORT NO.	PREPARED:	DATE ISSUE:	STATUS:	CHECKED:	AUTHORISED:
1	JH	27.02.2025	First Issue	VI	CH

CHANGE LOG.

VERSION NO.	DATE:	CHECKED BY:	REASON FOR CHANGE:
P01	04.03.2025	VI	Updated for Planning Issue
P02	14.03.2025	VI	Updated Development Plan
P03	28.03.2025	VI	Revised Development Plan
P04	08.07.2025	VI	Revised to address the National Standards for Sustainable Drainage Systems (SuDS)

CONTENTS

1 INTRODUCTION

1.1 Background

1.1.1 Link was commissioned by Richborough to prepare a Flood Risk Assessment and associated Drainage Strategy in respect to a proposed development off Orton Road in Warton, Warwickshire. As required by Warwickshire County Council, North Warwickshire Borough Council, and the North Warwickshire Local Plan, this report has been prepared to provide Flood Risk, Sustainable Drainage Strategy and Drainage Management Plan in support of an outline planning application. The landowners of the site are Michael Ensor Caton and Andrew Norman Caton.

1.1.2 The proposed scheme shall comprise of the construction of up to 110 dwellings, with access, landscaping, sustainable drainage features, and associated infrastructure. All matters are reserved except for primary vehicular access from Church Road. The proposed scheme shall also incorporate new pedestrian pathways around the site, with access onto Church Road and the adjacent recreation ground. The proposed site plan is included within Appendix A.

1.2 Site Location

1.2.1 The site is located north of Orton Road in the village of Warton in north Warwickshire. The site shall act as a subsequent development to the completed scheme immediately to the east. Vehicular access is being provided off Church Road. A Site Location Plan is included in Appendix A.

1.2.2 The site is currently greenfield and as such does not currently have a post code. However, the nearest post code for the development to the east is B79 0JG.

1.3 Topography

1.3.1 A detailed topographical survey of the site has been completed, and this is included in Appendix B of this report. The existing site level range has been found to be approximately 89.5mAOD in the westernmost corner of the site, to 79.3mAOD in the south-east corner.

1.3.2 The main features within the site are open field, with much of the site boundary lined with vegetation.

1.4 Former Land Uses

1.4.1 Historical free to view mapping (https://maps.nls.uk/geo) has been reviewed as part of this flood risk assessment, which indicates that the site has had no former land uses besides open field.

1.5 Ground conditions

1.5.1 A review of the British Geological Survey's geological mapping has been undertaken to determine the likely ground conditions on the site. Geological maps on the British Geological Survey online tools identify the bedrock geology as a combination of sandstone, siltstone and mudstone.

1.5.2 Furthermore, publicly available boreholes in the proximity of the site have been reviewed, which suggest the proposed development is mainly to be constructed on sand, gravel, and marl strata.

1.6 Watercourses

1.6.1 No major water features have been identified within the proximity of the site, with the nearest watercourses being Bramcote Brook, located approximately 900m north of the site, and the River Anker, located approximately 950m south of the site.

1.7 Drainage

As the site is greenfield, it is expected that no drains are located on site. Correspondence with Severn Trent Water (STW) has identified a pumped foul sewer running eastwards within Orton Road, and existing storm and foul gravity public sewers further to the east in Orton Road. It is expected that, if it is concluded that infiltration cannot be utilised as a viable outfall method, the proposed drainage strategy for the development will outfall into these public sewers. A sewer record for the area provided by STW is included in **Appendix C**.

1.8 Flood Zones and Vulnerability Classification

1.8.1 The formal flood zone mapping https://flood-map-for-planning.service.gov.uk/, approved by the government and prepared for use in the planning process, identifies areas potentially at risk of flooding from fluvial or tidal sources without considering the presence of flood defences or structures such as culverts or minor watercourses. An extract from the mapping is included in Figure 1; the red line denotes the site boundary.

Figure 1: Flood Zone Mapping

1.8.2 The formal flood zone mapping shows the site to be located entirely within Flood Zone 1, indicating a low risk of flooding. Table 1 indicates what uses of land are appropriate for each flood zone, as set out within *Table 2 – Flood risk vulnerability and flood zone 'incompatibility'* in the PPG of the NPPF. The proposed use would be defined as More Vulnerable so hence the proposed use is deemed acceptable.

	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test	✓	✓	✓
Zone 3a	Exception Test	✗	Exception Test	✓	✓
Zone 3b	Exception Test	✗	✗	✗	✓

Table 1 - Flood risk vulnerability and flood zone 'incompatibility'

1.9 National Planning Flood Risk Policies Relevant to this Development

1.9.1 The National Planning Policy Framework (NPPF) last revised by the Department of Communities and Local Government (DCLG) on 7th March 2025, took immediate effect on that date. The document Technical Guidance on the National Policy Framework (TGNPPF) also published by the Department of Communities and Local Government, has now been withdrawn and superseded by the Planning Practice Guidance (PPG), published on 29th November 2016.

1.9.2 The requirement for conducting an FRA as part of a planning application is set out in Footnote 63 on page 51 of the NPPF, which states:

"A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use."

1.9.3 Essential content of a site-specific FRA is explained in the PPG, paragraph 20 as follows:

"A site-specific flood risk assessment is carried out by (or on behalf of) a developer to assess the flood risk to and from a development site and should accompany a planning application where prescribed in footnote 55 of the National Planning Policy Framework. The assessment should demonstrate to the decision-maker how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users (see National Planning Policy Framework Annex 3 – Flood Risk Vulnerability).

"The objectives of a site-specific flood risk assessment are to establish:

- *whether a proposed development is likely to be affected by current or future flooding from any source;*
- *whether it will increase flood risk elsewhere;*
- *whether the measures proposed to deal with these effects and risks are appropriate;*
- *the evidence for the local planning authority to apply (if necessary) the Sequential Test, and;*
- *whether the development will be safe and pass the Exception Test, if applicable."*

1.9.4 For certain types of flood sensitive development, NPPF describes how the Local Planning Authority (LPA) should check that the site proposed has the lowest frequency of flooding of those available for the

development. This check is called the "Sequential Test." All development that is identified in the LPA's Local Development Framework Development Plan (LDFDP) has been Sequentially Tested using the LPA's Strategic Flood Risk Assessment (SFRA). When a test is required, and the development is not identified in the Development Plan, NPPF advises that the site-specific FRA includes the Test. NPPF also requires that the FRA includes an "Exception Test" for flood sensitive development proposed in areas with high frequency of flooding. The reason is to demonstrate that flood risk will be safely managed for the lifetime of the development.

1.9.5 "Non-Statutory Technical Standards for Sustainable Drainage Systems" published by Department for Environment, Food and Rural Affairs in March 2015 sets out Government expectations for surface water drainage systems serving major developments to restrict discharges to green field rates. The standards do not address the quality of surface water discharges and state circumstances when the discharge rate can be higher than green field, up to the existing flow in the case of redevelopment of brown field sites.

1.10 Local Policy Guidance

1.10.1 The North Warwickshire Local Plan, adopted in September 2021, outlines the requirements and considerations developers should follow as part of their proposals. As part of this report, the adopted policies have been reviewed, and the proposal has been developed to comply with their requirements. The relevant planning policy within the district plan, Policy LP33, is outlined below.

1.10.2 LP33 Water and Flood Risk Management

"*In line with the objectives of the Water Framework Directive, development proposals must not detrimentally affect the ecological status of a waterbody and where appropriate, incorporate measures to improve its ecological value.*

"*Opportunities should be sought to de-culvert rivers, in order to reduce flood risk through stopping flows backing up by undersized culverts. This should only be undertaken when it is demonstrated to not increase flood risk elsewhere. If de-culverting is not proposed evidence will be required to demonstrate why this is not possible. River channel restoration should also be undertaken to return the water course to its natural state and restore floodplain to reduce the impact of flooding downstream.*

"*New developments should also seek opportunities to improve natural riverine processes and instream and bankside morphology through watercourse re-naturalisation and the removal of manmade structures, both on the development site and in the wider catchment. Water runoff from new development must be no more than natural greenfield runoff rates and developments should hold this water back on the development site through high quality Sustainable Urban Drainage (SuDS), reducing pollution and flood risk to nearby watercourses. The culverting of watercourses will only be approved in exceptional circumstances.*

"*The multifunctional benefits of natural flood management, the re-naturalisation of watercourses and their floodplains and the safeguarding of land for local flood risk management schemes will be promoted when considering any developments in the Borough.*

"*New development proposals in or land raising within Flood Zone 3 (including Climate Change) should provide for the following:*

i) Floodplain Compensation; provide floodplain compensation on a level-for-level basis;

ii) should set back 8m from the top of the banks of Main Rivers and any culverted watercourse, regardless of the flood zone;

iii) Finished floor levels (FFL) within Flood Zone 3 (including climate Change) and on land adjacent should be set a minimum of 600mm above Flood Zone 3, (including climate change) flood level;

iv) have agreements in place that "less vulnerable" uses are prevented for changing to those that are more vulnerable, and (only applies to ground floor developments in line with SFRA section 12.4), and single storey residential development, basements and buildings on stilts should not be located within Flood Zone 3 (including climate change), and

v) include mitigation measures to account for up to the 1 in 100 year (1% AEP) plus climate change fluvial flood event as well as safe access and egress

"*In order to improve and protect water quality, infiltration measures are the preferred means of surface water disposal where ground conditions are appropriate and where practicable, the separation of surface water from sewers should be undertaken. New development proposals should be accompanied by a Water Statement that includes evidence to demonstrate that there is adequate sewerage infrastructure in place or that it will be in place prior to occupation.*"

1.11 National Standards for Sustainable Drainage Systems (SuDS)

1.11.1 This application has been prepared following the National Standards for Sustainable Drainage Systems (SuDS). The 'SuDS Approach' as defined in Principle 3 has been used considered throughout the scheme development.

- *mimicking natural drainage systems and delivering surface water management that recognises the value of rainfall and runoff as a resource;*
- *managing surface water flooding and the rates and volumes of runoff from developments now and in the future;*
- *contributing to cleansing diffuse particulate and chemical substances that may be found in surface water runoff;*
- *using drainage features in combination as a management train, which integrates these throughout the development and its landscape to help create healthy and resilient spaces for people and habitats for wildlife;*
- *managing runoff close to its source, prioritising features that lie on the surface and incorporate vegetation;*
- *meeting the requirements for delivering multiple benefit SuDS over the lifetime of the development by planning for a changing climate and ensuring long-term maintenance;*
- *being sustainable, considering both construction and long-term maintenance and the additional environmental and social benefits afforded by the system;*

2 FLOOD RISK

2.1 Flood Risk from Rivers and Watercourses

2.1.1 The site is shown on the available flood maps, see Figure 2, to be at a Very Low risk of flooding from fluvial sources. Therefore, the site is not considered to be at risk of flooding from rivers and watercourses.

Figure 2: Flood Risk from Rivers and Watercourses

2.2 Flooding from the Sea

2.2.1 The site is approximately 117km from the nearest sea, at a minimum elevation of approximately 79.3mAOD. Therefore, it is considered that the risk of flooding from the sea is negligible and is not discussed further within this report.

2.3 Flooding from Land

2.3.1 A source of flood risk to the site is from surface water flooding created by the site itself or adjacent areas. Based on the Surface Water Maps available, see Figure 3.

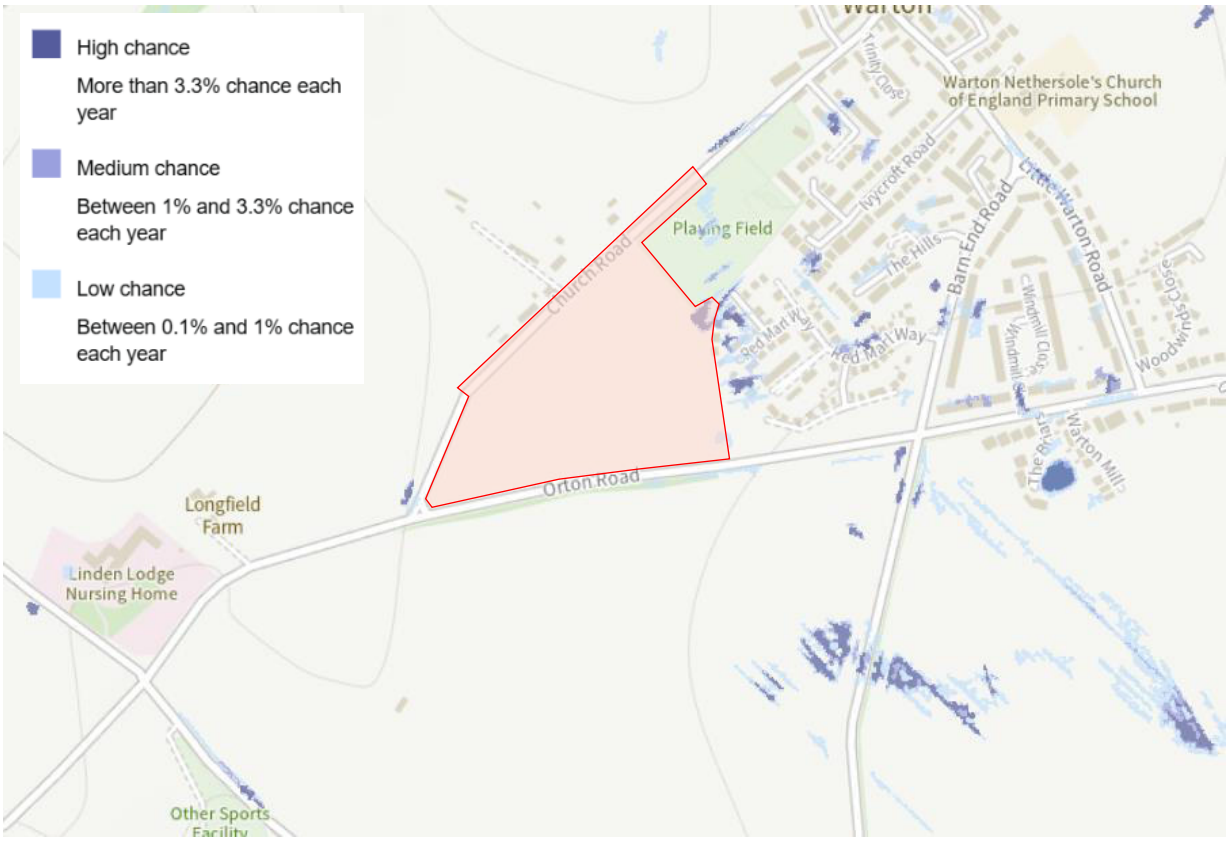


Figure 3: Flood Risk from Surface Water

2.3.2 The site is predominantly at a Low Risk of flooding from this source, with areas of higher flood risk encroaching slightly into the east of the site. This is primarily associated with the existing pond in the east of the site, and the existing adjacent development. The eastern boundary also forms the lowest region of the site topographically. Suitable mitigation measures shall be provided in Section 3 to overcome any risk presented by these areas.

2.3.3 Overall, the site in considered to be at a Low Risk of surface water flooding.

2.4 Flooding from Groundwater

2.4.1 Warwickshire's Level 1 Strategic Flood Risk Assessment includes groundwater vulnerability mapping across the county. The mapping suggests that the site is at a low vulnerability (<25%) of groundwater flooding. It should be noted that this mapping is high level and is based on a 1km^2 grid within which the site lays.

2.4.2 Borehole records in the vicinity of the site indicate groundwater levels are at least 30m below ground level in the area. Furthermore, no watercourses exist in close proximity to the site.

2.4.3 Therefore, it can be concluded that the proposed development is at low risk from flooding by groundwater.

2.5 Flooding from Sewers

2.5.1 Flooding can occur from other sources such as blocked drains and sewers. Correspondence with Severn Trent Water, the local water company, highlighted that there are no public sewers within the site. Furthermore,

it is expected that sewers in the area are periodically maintained by STW. Therefore, the proposed development is at low risk from flooding by blocked drains and sewers.

2.6 Flooding from Reservoirs, Canals and Other Artificial Sources

2.6.1 The reservoir flood map shown in Figure 4 shows the extent of flooding should a canal, reservoir, or other artificial source breach upstream of the development. This shows that the site would not be at risk of flooding from this source and as such this source of flooding is not considered a risk.

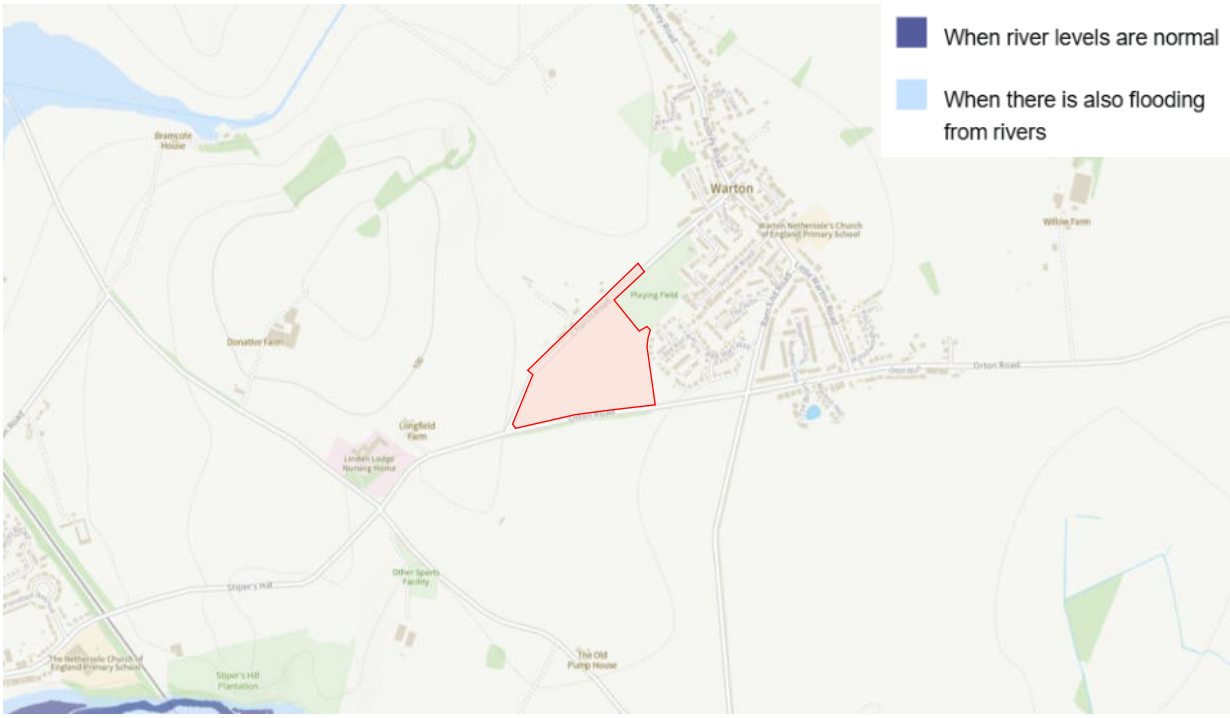


Figure 4: Flood Risk from Artificial Sources

3 MITIGATION

3.1 Flood Risk Management

3.1.1 It is suggested that the following flood risk management measures are considered to mitigate the risks identified above:

- *It is recommended that the development finished floor levels are set above the existing levels and at least 150mm above the proposed surrounding external levels;*
- *Wherever possible, the external ground profile in the development will ensure that surface water is directed away from the building / buildings / vulnerable areas;*
- *The proposed development will incorporate a positive surface water drainage system, described further in Section 4, which will intercept runoff from roofs and paved areas before discharging flows offsite at a rate no higher than the existing values.*

3.2 Residual Risks

3.2.1 Residual risks are the risks that remain once the flood risk management measures described above have been implemented. These are typically associated with extreme events that overwhelm drainage systems exceeding the flood levels used to design any mitigation measures. The primary residual risks that will affect this development are:

- *An extreme rainfall event which exceeds the capacity of the proposed surface water drainage system to both intercept and convey the flows. During such an event, water that is unable to enter the formal drainage system will flow over the ground through the development. The risk can be reduced by designing site levels to direct any runoff towards the highways, adjacent watercourses, or other corridors running through the site;*
- *A lack of, or insufficient, maintenance of the installed drainage system which may cause flow restriction;*
- *A rainfall event that exceeds the capacity of surrounding off-site drainage networks could also result in runoff entering the site via routes other than the highways.*

4 PROPOSED DRAINAGE STRATEGY

4.1 Outfall Assessment

4.1.1 As required by Part H of the Building Regulations and the paragraph 7-056 in Planning Policy Guidance of the NPPF, and Standard 1 from the National Standards for Sustainable Drainage Systems (SuDS) the required Drainage Hierarchy has been considered in the development of this strategy as summarised below.

Standard	Outfall Option	Available Option	Comment
National Standards for SuDS	Collection for non-potable use	✓	Options for incorporating rainwater harvesting systems have been evaluated. While the available systems were deemed unviable for the residential development, a rainwater harvesting system has been proposed for the irrigation of the central landscaped area
NPPF/National Standards for SuDS	Infiltration Drainage	✓	Although infiltration was not considered a viable primary method for surface water discharge, infiltration techniques have been employed, based on an infiltration rate of less than $1x10^{-6}$ m/s for the management of the everyday rainfall (5 mm)
NPPF/National Standards for SuDS	Watercourse	×	There are no watercourses in the vicinity of the site which could form a suitable outfall.
NPPF/National Standards for SuDS	Surface Water Sewer	✓	It is proposed to discharge surface water flows from the site into the STW public surface water sewer to the east, at the junction between Orton Road and Windmill Close.
NPPF/National Standards for SuDS	Combined Sewer	N/A	Not considered

Table 2 – Outfall Assessment

4.2 SuDS Assessment

4.2.1 As part of the surface water drainage strategy for the site a number of Sustainable Drainage Systems (SuDS) forming a treatment train were considered. Table 3 overleaf provides a list of the options considered and a justification for their inclusion or omission.

SuDS System	Used	Justification
Rainwater Harvesting System	Yes	A rainwater harvesting system has been proposed for the irrigation of the central landscaped area.
Green Roofs	No	Green roofs have not been proposed for this site as there is insufficient access to roof areas for maintenance and as such the system could not be effectively maintained to ensure long term performance.
Infiltration Systems	Yes	Although infiltration was not considered a viable primary method for surface water discharge, infiltration techniques have been employed, based on an infiltration rate of less than $1x10^{-6}$ m/s for the management of the everyday rainfall (5 mm)
Proprietary Treatment Systems	No	The use of proprietary treatment systems is not considered economically viable or required on this site considering installation and operational costs.
Filter Strips	No	Filter strips have not been considered the most effective proposal for this site due to the proposed site layout.
Filter Drains	No	Filter Drains have not been considered the most effective proposal for this site due to the proposed site layout.
Swales	Yes	Swales are included to provide effective source control, reduce runoff rates, improve water quality through natural filtration, and enhance amenity and biodiversity in line with SuDS principles.
Bioretention Systems	No	Bioretention Systems have not been considered the most effective proposal for this site due to the lack of available landscape areas.
Porous Pavements	Yes	Areas of the proposed development to be finished with porous pavements. The areas to be confirmed at detailed design stage.
Attenuation Storage Tanks (oversized pipes)	No	An above-ground attenuation pond has been selected instead of a tank.
Detention Basins	Yes	A detention basin has been provided in the southeast corner of the site to treat and attenuate all surface water flows picked up by the drainage network.
Ponds and Wetlands	No	Ponds and wetlands were found to be the most viable option for this development. Detention basin has been proposed instead.

Table 3 – SuDS Assessment

4.2.2 As this assessment forms part of an outline planning application the suitability SuDS features will have to be reviewed at reserved matters stage. It is proposed that suitable features will be provided to support both flood risk and water quality as defined by industry standards and local policies.

4.2.3 The outline proposals for the drainage system include private storm and foul pipes combined with an attenuation pond to store surface water flows before a controlled discharge.

4.2.4 A diagram of the proposed surface water treatment train based on Table 3 above is shown in Figure 5 below.

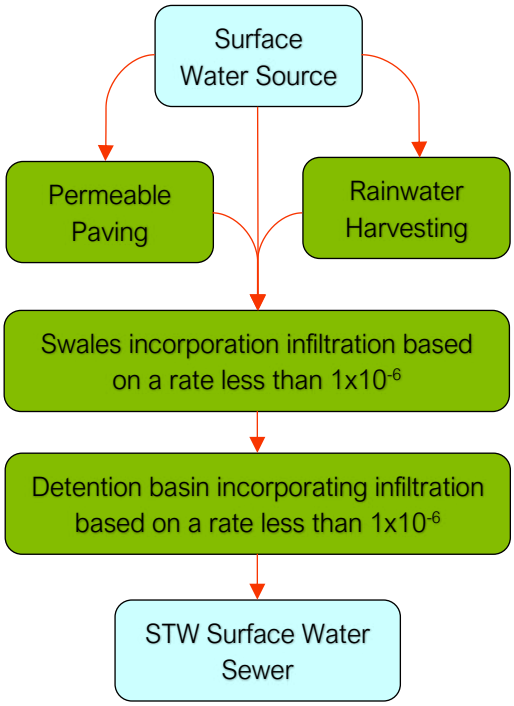


Figure 5 - SuDS Treatment Train

4.3 Proposed Surface Water Drainage Strategy

4.3.1 It is anticipated that a new drainage system will comprise permeable paving, swales, pipes and gullies, alongside the detention basin to treat and store flows ahead of discharge. All flows from developable land parcels shall enter the drainage network and be conveyed through the swales and detention basin, before being discharged at a restricted rate via a flow control device. Surface water flows will then travel beneath Orton Road to the east, before ultimately discharging into an existing STW public sewer at the junction between Orton Road and Windmill Close.

4.3.2 In accordance with Policy LP33, on sustainable drainage systems and the Strategic Flood Risk Assessment for the area, and Standard 3 form the National Standards for Sustainable Drainage Systems (SuDS) it is proposed that the maximum discharge rate up to a 100-year storm plus 40% allowance for climate change is restricted to 24.1l/s (the Qbar rate for the site). A calculation extract for this proposed flow rate is included in Appendix D. In order to restrict the flow, it is proposed to use a flow control device downstream of the attenuation pond.

4.3.3 To support this assessment a Drainage Strategy Drawing No. OR-LINK-GEN-XX-DR-C-0500 has been prepared and is included at Appendix D, along with supporting calculations demonstrating the system's performance. The proposed system has been assessed for a number of return periods and a series of rainfall events and the discharge rates for the critical storms are provided in Table 4.

Return Period	Allowable Discharge Rate (l/s)	Proposed Discharge Rate (l/s)
1 in 1 year	24.1	23.1
1 in 30 year + 35% CC	24.1	24.1
1 in 100 year + 40% CC	24.1	24.1

Table 4 – Surface water discharge rates

4.3.4 In addition to the surface water treatment provided by the SuDS features the following measures are to be included within the surface water drainage system to improve water quality prior to discharge offsite.

- *Trapped gullies;*
- *Sediment sump within flow control device.*

4.4 Management of everyday rainfall (interception)

4.4.1 Following Standard 2 from the National Standards for Sustainable Drainage Systems (SuDS), a detailed assessment of the everyday runoff – 5mm rainfall – has been prepared for this development. The assessment is based on the proposed SuDS features, infiltration rate less than $1x10^{-6}$, and CIRIA C753 Guidance section Chapter 24.8. The assessment is based on the following:

- Total impermeable area – 1.898 Ha or 18,980 m^2.

  The total impermeable area is based on 60% impermeability applied to the total development area, and 100% impermeability applied to the proposed highways areas. The total area also allows for urban creep.

- The proposed permeable paving area totals approximately 1,716 m², based on the assumption that 65% of residential plots will incorporate permeable driveways. For the purpose of this assessment, it is further assumed that adjacent hard surfaces—such as footways, footpaths, and other hard landscaping—will be graded to drain towards the permeable parking bays, contributing an additional 50% to the effective catchment area treated by this SuDS feature:

  110 plots x 65% x 24m^2(4.8x5m for double driveway) x 1.5 = 2,574 m^2

- Area used for the assessment of the 5mm rainfall event – 16,406 m^2 – Total development area minus the area intercepted by permeable paving.

- Swale 1 with base area of 28 m^2. The proposed swale base area was calculated as defined by CIRIA C753 Report.

- Swale 2 with base area of 42 m^2. The proposed swale base area was calculated as defined by CIRIA C753 Report.

- Detention basin with base area of 755 m^2. The proposed swale base area was calculated as defined by CIRIA C753 Report.

To capture and promote evapotranspiration for the first 5mm of rainfall, it is proposed to provide temporary storage with maximum depth ≥100mm as outlined by CIRIA C753 SuDS Guidance, Chapter 24.8. To achieve this, the base level of the proposed swales and detention basin are to be 100mm lower than the outlet pipe invert levels. Detailed calculations are presented in Table 5 below.

SuDS Feature	Base Area	Threated Impermeable Area	Attenuated volume based on 5mm rainfall	Inver level above base
	[m^2]	[m^2]	[m^3]	[mm]
Permeable paving	1716	2574	12.87	N/A
Swale 1	28	560	2.80	100
Swale 2	42	840	4.2	100
Detention Basin	755	15006	75.03	100
Total Impermeable Area		18980		

Table 5 - Calculations for the interception of the everyday rainfall

4.5 Water Quality

4.5.1 As per Table 26.2 in CIRIA 753 The SuDS Manual, the site is classed as residential and thus has a 'Low' Pollution Hazard Level. The corresponding pollution indices for this hazard level for the three main sources of pollution are provided in Table 6 .

Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Low	0.5	0.4	0.4

Table 6 – Pollution Hazard Level and Indices

4.5.2 Table 26.3 in CIRIA 753 provides mitigation indices for various SuDS features against the three main sources of pollution. The corresponding mitigation indices for the proposed SuDS features for each of the sources of pollution are provided in Table 7.

SuDS	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Detention basin	0.5	0.5	0.6
Swale	0.5	0.6	0.5
Permeable Paving	0.7	0.6	0.7

Table 7 – SuDS Pollution Hazard

4.5.3 This demonstrates that the proposed SuDS features are sufficient for mitigating against potential sources of pollution on site as the mitigation index for each source of pollution is greater than the corresponding pollution index.

Total SuDS mitigation Index = mitigation index$_1$ + 0.5mitigation index$_2$ + 0.5mitigation index$_3$

SuDS mitigation: Total Suspended Solids (TSS) – 1.1

Metals – 1.1

Hydrocarbons – 1.2

4.6 Amenity and Biodiversity

4.6.1 As part of this Flood Risk Assessment, an assessment of the impact to Amenity and Biodiversity provided by the additional SuDS features has been prepared and is included within **Appendix E**.

4.7 Exceedance Flows

4.7.1 The potential source of overland flooding on the site is failure of the surface water drainage system or a rainfall event in excess of the systems or surrounding areas design parameters.

4.7.2 As noted above the site falls from west to east, so any overland exceedance flows shall be directed by the levels design through the highways. These routes have been highlighted on the Drainage Strategy Drawing No. OR-LINK-GEN-XX-DR-C-0500.

4.8 Foul Water Drainage Strategy

4.8.1 In similar fashion to the surface water drainage, the proposed foul drainage network shall convey flows from the residential land parcels southeast along Orton Road, before outfalling to an existing STW public foul sewer at the junction between Orton Road and Barn End Road.

4.8.2 In order to establish the foul outfall, a developer enquiry was submitted to STW, the local water company. The response to this developer enquiry application confirmed that the foul sewer to the east of the site has sufficient capacity to accept the foul flows from the proposed development and STW would be willing to accept a connection to their network at a preferred location (MH3202), subject to a formal S106 application being made ahead of connection.

4.8.3 The foul drainage strategy is shown on drawing OR-LINK-GEN-XX-DR-C-0500 included in **Appendix D**.

5 DRAINAGE MANAGEMENT PLAN

5.1 Responsibility

5.1.1 The occupier of the proposed development shall be responsible for the maintenance and operation of the drainage system, including any attenuation and flow control devices.

5.2 Maintenance of Pipe Networks

5.2.1 Maintenance and management of main storm sewers and chambers inclusive of pipework from paved areas and buildings (but excluding internal building drainage) should be visually inspected and jetted/cleaned as required. As a minimum, this should be carried out every 5 years. Methods of inspection to give indications of blockages etc. may include:

- *Pulling a mandrel through the pipe to identify physical faults (e.g., disjointed pipes).*
- *Flushing/jetting.*
- *CCTV.*
- *Measurement of water depths in pipe entries, catchpits or interceptors along a drain run may identify potentially blocked pipes.*

5.2.2 Gully gratings, manhole gratings and channel gratings shall be visually inspected at least once every year and replaced or re-set if damaged or dislodged. Gullies should be inspected at least once every year, ideally during springtime as the autumn and winter seasons produce the most detritus build up in the form of leaves, litter and silt. This material should be removed from the channels and disposed of at a licensed tip. This material should not be tipped in other areas of the development as it may pose a pollution threat to the surrounding drainage system.

5.2.3 Jetting should only be carried out after removal of the silt and debris, as jetting alone will simply wash the debris further downstream without removing the problem.

5.3 Maintenance of Rainwater Harvesting System

5.3.1 The rainwater harvesting system proposed for landscape irrigation will require regular inspection and maintenance to ensure optimal performance and water quality. Key tasks include periodic cleaning of filters, inspection of the storage tank for debris or sediment build-up, and verification of pump functionality. Maintenance should be carried out in accordance with the manufacturer's guidelines and recorded as part of the site's overall SuDS maintenance schedule.

5.4 Maintenance of SuDS Features

5.4.1 The regular and correct maintenance of the SuDS features is essential to the continued performance. The SuDS Manual C753 provides advice on the management of the system.

5.4.2 The recommended maintenance regimes for the Detention basin, as highlighted in Figure 6, is given in Table 22.1 in the SuDS Manual C753 respectively, which will form the basis of the strategy for the provided development.

TABLE 22.1 Operation and maintenance requirements for detention basins

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

Figure 6 – Table 23.1 of CIRIA 753

5.4.3 The recommended maintenance regimes for the Swales, as highlighted in Figure 7 below, is given in Table 17.1 in the SuDS Manual C753 respectively, which will form the basis of the strategy for the provided development.

TABLE 17.1 Operation and maintenance requirements for swales

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

Figure 7 – Table 17.1 of CIRIA 753

5.4.4 The recommended maintenance regimes for the Permeable Paving, as highlighted in Figure 8 below, is given in Table 20.15 in the SuDS Manual C753 respectively, which will form the basis of the strategy for the provided development.

TABLE 20.15 Operation and maintenance requirements for pervious pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Figure 8 – Table 20.15 of CIRIA 753

5.4.5 It should be noted that maintenance regimes detailed above are initial recommendations and the actual maintenance work undertaken should be adapted to suit the system performance by the maintenance provider.

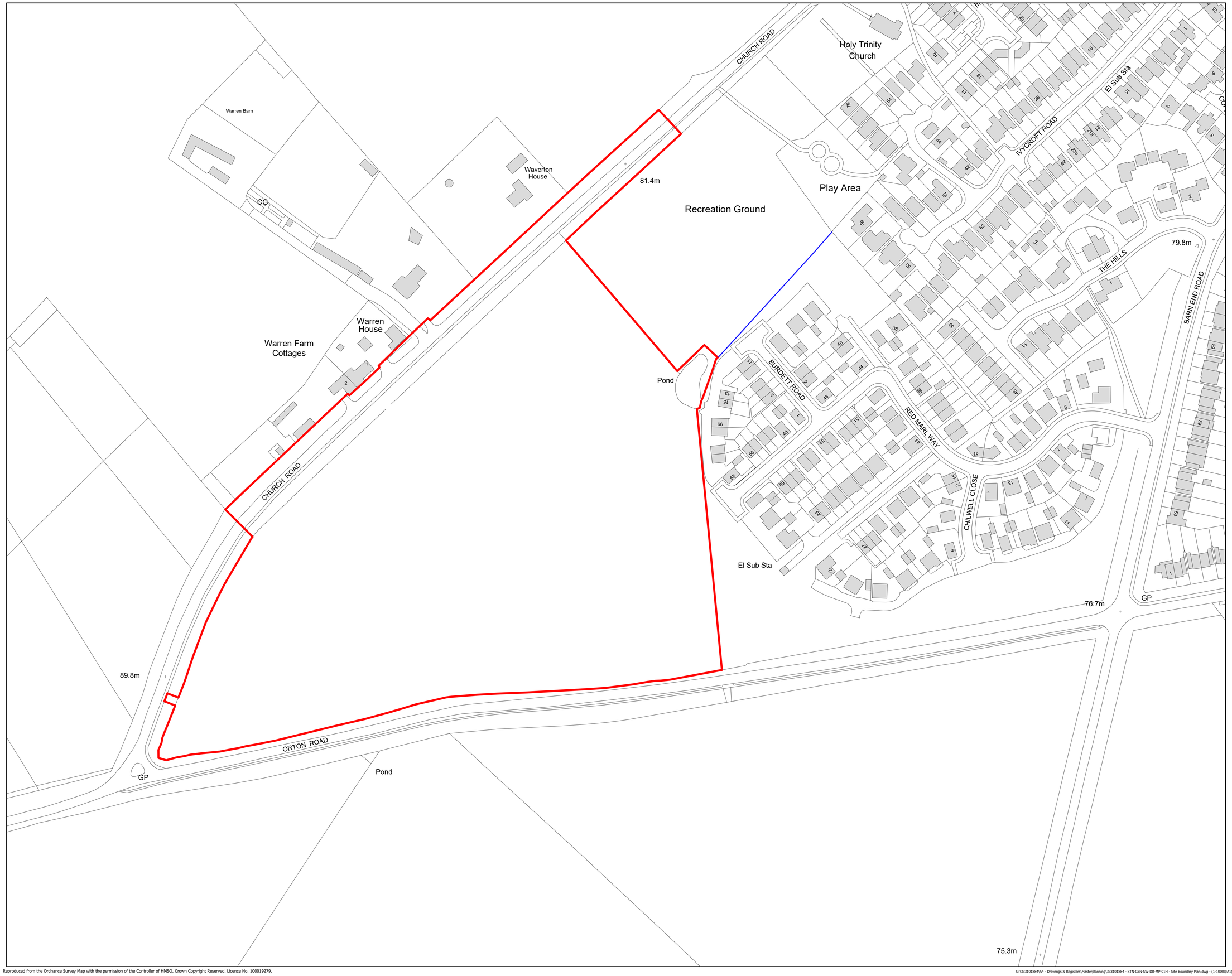
6 CONCLUSION

6.1.1 This site-specific Flood Risk Assessment has been prepared in accordance with NPPF guidance, local policy on Flood Risk, and National Standards for Sustainable Drainage Systems (SuDS). The government approved flood mapping shows the site to be located within Flood Zone 1, indicating a Low flood risk from both fluvial and pluvial sources on the site. Further to this, the proposed levels on the site shall be set such that in the unlikely event of these systems failing the development on the site will remain protected.

6.1.2 The drainage strategy demonstrated that an appropriate drainage system for both foul and surface water can be provided on the site which discharges to a suitable outfall. Subject to the mitigation measures proposed, the development may proceed without being subject to significant flood risk. Moreover, the development will not significantly increase flood risk to the wider catchment area.

APPENDICES

APPENDIX A – Proposed Site Plan



The scaling of this drawing cannot be assured

Revision		Date	Drn	Ckd
H	Updated Site Boundary	25.03.25	J.W.	T.L.

Site Boundary

Land Within Land Owners Control (30cm wide Strip)

Richborough

Project
LAND OFF ORTON ROAD, WARTON

Drawing Title
SITE BOUNDARY PLAN

N

Date	Scale	Drawn by	Check by
30.01.25	1:1,000@A1 1:2,000@A3	J.W.	T.L.
Project No	**Drawing No**		**Revision**
333101884	STN-GEN-SW-DR-MP-01		H

0 20 40 60m

Stantec

Stantec UK Limited
The Blade
Abbey Square
Reading
RG1 3BE
T: 0118 9430 000

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The scaling of this drawing cannot be assured

Revision		Date	Drn	Ckd
P	LAP added & drainage updated	10.07.25	S.M.	T.L.

CHURCH ROAD

ORTON ROAD

- Site Boundary
- Proposed Residential Development
- Proposed Open Space and Paths
- Proposed Highway
- Proposed Sustainable Drainage
- Proposed Swale
- Existing Recreation Ground
- Proposed Access/Egress for All Modes
- Proposed Access/Egress for Pedestrians
- Potential Future Access
- Existing Landscape
- LAP

Richborough

Project
LAND OFF ORTON ROAD, WARTON

Drawing Title
ILLUSTRATIVE FRAMEWORK PLAN

N

Date	Scale	Drawn by	Check by
30.01.25	1:1,000@A1 1:2,000@A3	J.W.	T.L.

Project No	Drawing No	Revision
333101884	RG-M-Ai02	P

0 50m

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Abbey Square
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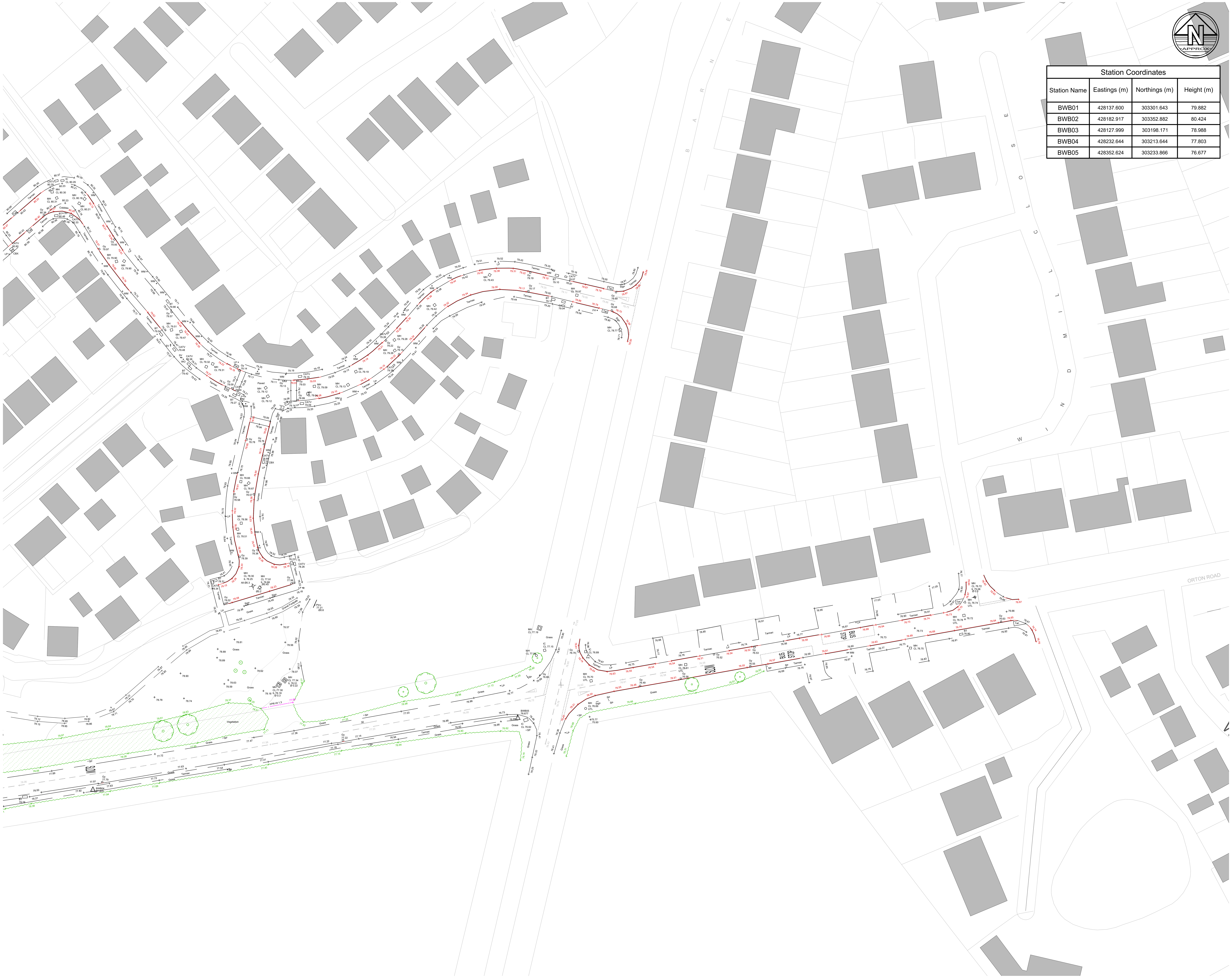
APPENDIX B – Topographical Survey



Station Coordinates

Station Name	Eastings (m)	Northings (m)	Height (m)
BWB01	428137.600	303301.643	79.882
BWB02	428182.917	303352.882	80.424
BWB03	428127.999	303198.171	78.988
BWB04	428232.644	303213.644	77.803
BWB05	428352.624	303233.866	76.677

Notes

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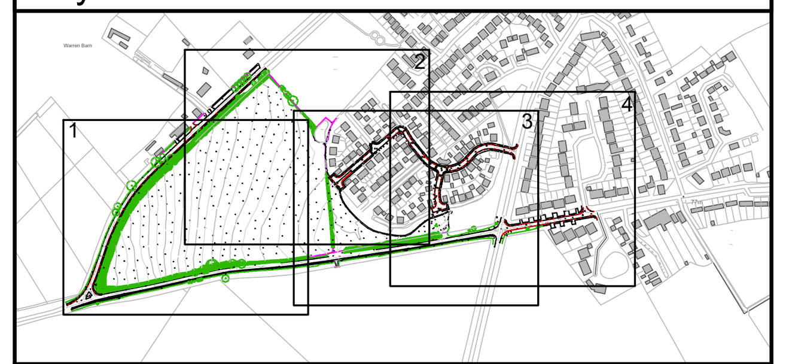
7. All manhole data is collected from ground level therefore discrepancies may occur. More accurate data is only achievable via confined space entry.
8. OS license number: 100022432

Key Plan



Legend

OS Buildings
Surveyed Buildings
Building
Wall
Kerb Channel Line
Top of Kerb
Edge of Surface
Top of Bank
Bottom of Bank
Canopy / Overhang
Line Marking
Centre Line
Watercourse Centre Line
Barrier
Fence
Gate
Overhead Powerline
Overhead Utilities
Contour Lines
Inspection Chamber
0.25 Flow direction and pipe diameter
1 Station and Name
BH 1 Monitoring Borehole
Tree / Bush / Sapling
Area of Vegetation/ Extent of Tree Canopy
Hedge
Body of Water
Body of Water from OS
+50.00 Spot Level
Assumed Surface Water Drainage Line
Surface Water Drainage Line

AP	Anchor Point	FBW	Fence Barbed Wire	LB	Litter Bin
BG	Back Gully	FCB	Fence Closed Board	LP	Lamp Post
BO	Bollard	FCL	Fence Chain Link	MH	Manhole
BS	Bus Stop	FEL	Fence Electric	Mkr	Service Marker
BT	British Telecom	FMP	Fence Metal Panel	PB	Post Box
C	Crest	FMR	Fence Metal Railing	PT	Post
CL	Cover Level	FOB	Fence Open Board	RE	Rodding Eye
CMP	Cable Marker Post	FPW	Fence Post & Wire	SP	Sign Post
		FSP	Fence Steel Palisade	ST	Stop Tap
CCTV	Security Camera	FWM	Fence Wire Mesh	SV	Stop Valve
CTV	Cable TV	FFL	Finished Floor Level	TCB	Telephone Call Box
DC	Drainage Channel	FP	Flagpole		
		Gas	Gas	THL	Threshold Level
DK	Drop Kerb	GV	Gas Valve	TL	Traffic Light
DP	Down Pipe	GY	Gully	TP	Telegraph Post
Elec	Electric	Ht	Height	TS	Traffic Signal
EP	Electricity Post	IC	Inspection Chamber	UTS	Unable to Survey
ER	Earth Rod	IFL	Internal Floor Level	WL	Water Level
FH	Fire Hydrant	IL	Invert Level (as a reduced level)	WM	Water Meter
FL	Floodlight			WO	Wash Out

Rev	Date	Details of issue / revision	Drw	Rev
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Client

Richborough Estates Limited

Project Title

Land off Orton Road Phase 2

Drawing Title

Existing Site Plan Sheet 4 of 4

Drawn:	D.Smith	Reviewed:	S.Shreeves		
BWB Ref:	244061	Date:	18.02.25	Scale@A1:	1:500

Drawing Status

Information

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
244061-BWB-00-04-DR-G-0001	S2	P1

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Station Coordinates			
Station Name	Eastings (m)	Northings (m)	Height (m)
BWB01	428137.600	303301.643	79.882
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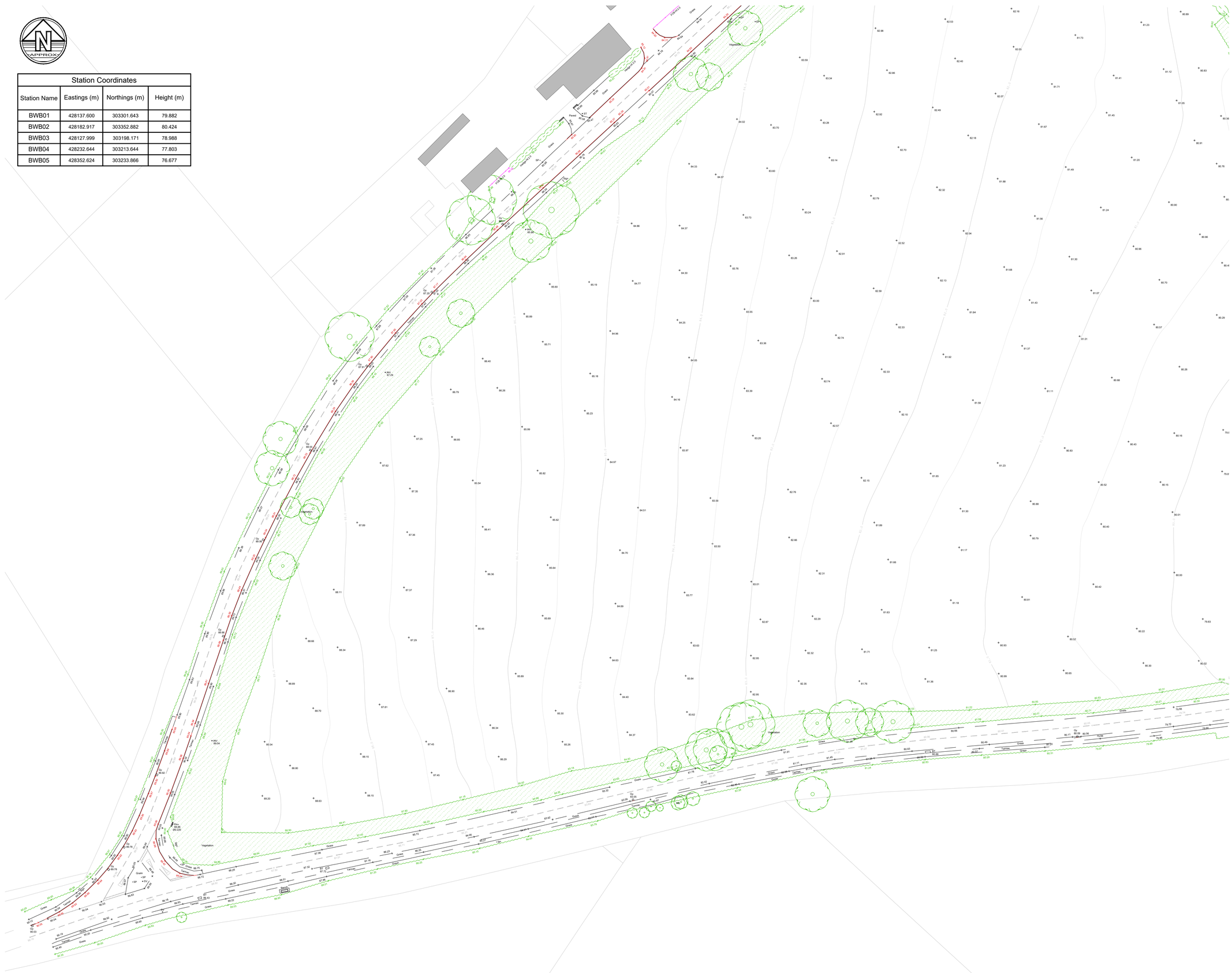

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8. OS license number: 100022432

Key Plan

Legend

OS Buildings		Contour Lines	
Surveyed Buildings		Inspection Chamber	
Building		Flow direction and pipe diameter	0.25 / 1
Wall		Station and Name	
Kerb Channel Line		Monitoring Borehole	BH 1
Top of Kerb		Tree / Bush / Sapling	
Edge of Surface		Area of Vegetation/ Extent of Tree Canopy	
Top of Bank		Hedge	
Bottom of Bank		Body of Water	
Canopy / Overhang		Body of Water from OS	
Line Marking		Spot Level	50.00
Centre Line		Assumed Surface Water Drainage Line	
Watercourse Centre Line		Surface Water Drainage Line	
Barrier			
Fence			
Gate			
Overhead Powerline			
Overhead Utilities			

AP	Anchor Point	FBW	Fence Barbed Wire	LB	Litter Bin
BG	Back Gully	FCB	Fence Closed Board	LP	Lamp Post
BO	Bollard	FCL	Fence Chain Link	MH	Manhole
BS	Bus Stop	FEL	Fence Electric	Mkr	Service Marker
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Rev	Date	Details of issue / revision	Drw	Rev
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Drawing Title

Existing Site Plan Sheet 1 of 4

Drawn:	D.Smith	Reviewed:	S.Shreeves
BWB Ref:	244061	Date: 18.02.25	Scale@A1: 1:500

Drawing Status

Information

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
244061-BWB-00-01-DR-G-0001	**S2**	**P1**

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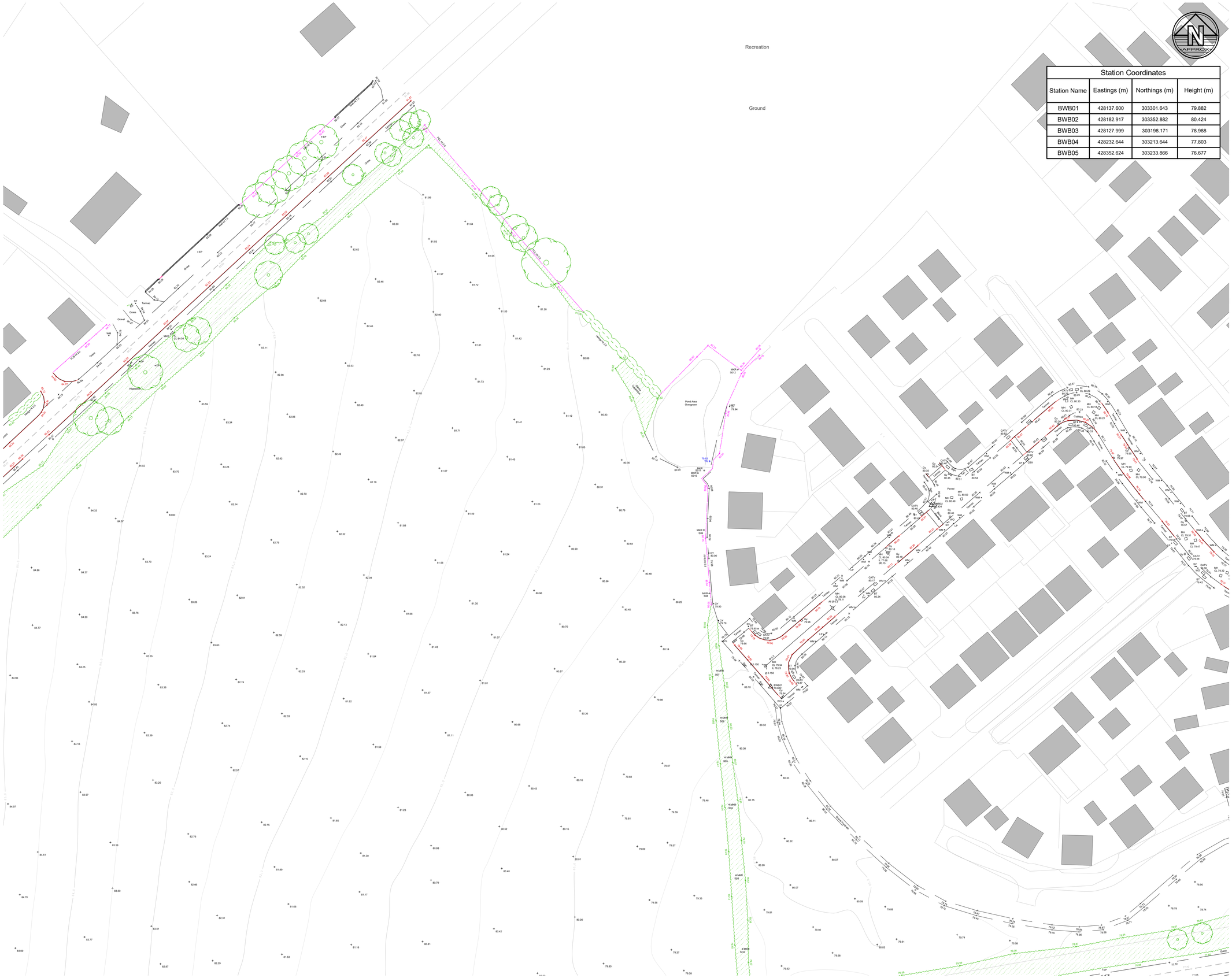

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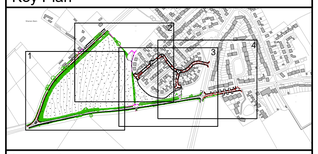

Legend

- OS Buildings
- Surveyed Buildings
- Building
- Wall
- Kerb Channel Line
- Top of Kerb
- Edge of Surface
- Top of Bank
- Bottom of Bank
- Canopy / Overhang
- Line Marking
- Centre Line
- Watercourse Centre Line
- Barrier
- Fence
- Gate
- Overhead Powerline
- Overhead Utilities
- Contour Lines
- Inspection Chamber
- Flow direction and pipe diameter (0.25 / 1)
- Station and Name (BH 1)
- Monitoring Borehole
- Tree / Bush / Sapling
- Area of Vegetation/ Extent of Tree Canopy
- Hedge
- Body of Water
- Body of Water from OS
- Spot Level (+50.00)
- Assumed Surface Water Drainage Line
- Surface Water Drainage Line

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FL	Floodlight	IL	Invert Level (as a reduced level)	WO	Wash Out

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Drawing Title

Existing Site Plan Sheet 2 of 4

Drawn:	D.Smith		Reviewed:	S.Shreeves	
BWB Ref:	244061	Date:	18.02.25	Scale@A1:	1:500

Drawing Status

Information

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
244061-BWB-00-02-DR-G-0001	**S2**	**P1**

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Station Coordinates			
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Key Plan

Legend

- OS Buildings
- Surveyed Buildings
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- Kerb Channel Line
- Top of Kerb
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- Top of Bank
- Bottom of Bank
- Canopy / Overhang
- Line Marking
- Centre Line
- Watercourse Centre Line
- Barrier
- Fence
- Gate
- Overhead Powerline
- Overhead Utilities
- Contour Lines
- Inspection Chamber
- Flow direction and pipe diameter (0.25 / 1)
- Station and Name
- Monitoring Borehole (BH 1)
- Tree / Bush / Sapling
- Area of Vegetation/ Extent of Tree Canopy
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- Spot Level (+50.00)
- Assumed Surface Water Drainage Line
- Surface Water Drainage Line

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BS	Bus Stop	FEL	Fence Electric	Mkr	Service Marker
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C	Crest	FMR	Fence Metal Railing	PT	Post
CL	Cover Level	FOB	Fence Open Board	RE	Rodding Eye
CMP	Cable Marker Post	FPW	Fence Post & Wire	SP	Sign Post
		FSP	Fence Steel Palisade	ST	Stop Tap
CCTV	Security Camera	FWM	Fence Wire Mesh	SV	Stop Valve
CTV	Cable TV	FFL	Finished Floor Level	TCB	Telephone Call Box
DC	Drainage Channel	FP	Flagpole	THL	Threshold Level
DK	Drop Kerb	Gas	Gas	TL	Traffic Light
DP	Down Pipe	GV	Gas Valve	TP	Telegraph Post
Elec	Electric	GY	Gully	TS	Traffic Signal
EP	Electricity Post	Ht	Height	UTS	Unable to Survey
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FH	Fire Hydrant	IFL	Internal Floor Level	WM	Water Meter
FL	Floodlight	IL	Invert Level (as a reduced level)	WO	Wash Out

Rev	Date	Details of issue / revision	Drw	Rev
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APPENDIX C – Severn Trent Water Correspondence and Sewer Records

WONDERFUL ON TAP

SEVERN TRENT

Severn Trent Water Ltd
Oxley Moor Road
Wolverhampton
WV9 5HN

www.stwater.co.uk
network.solutions@severntrent.co.uk

Contact: Jasveer Bullock
Contact No: 07970198053

Your ref:
Reference: 1138609

Megha Bhat
Link Engineering
148-149 Great Charles Street
Queensway
Birmingham
B3 3HT

16th January 2025

Dear Megha

Proposed Development: Land off Orton Road, Warton, Tamworth, B79 0JX (X – 427949, Y – 303261)

I refer to your 'Development Enquiry Request' for the development of 100 new dwellings at the above named site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes which refer to surface water disposal from development sites.

Public Sewers in Site – Required Protection

Due to a change in legislation on 1 October 2011, there may be former private sewers on the site which have transferred to the responsibility of Severn Trent Water Ltd, which are not shown on the statutory sewer records but are located within your client's land. These sewers would also have protective strips that we will not allow to be built over. If such sewers are identified to be present on the site, please contact us for further guidance.

Foul Water Drainage

I can confirm we would not have any objections to the anticipated additional foul flows of approximately 1.56 litres/second 2xDWF to the 225mm diameter public foul sewer, as this will not have an adverse impact on the network. The nearest available point for a gravity connection is in the Orton Road with the nearest manhole reference 3202. However, there are 2 incoming pipes into this manhole, one being a pressurised sewer, therefore, we would advise that the connection is made upstream of that manhole towards manhole 3201 in the road, or connect downstream of manhole 3202 approximately 10 metres from the manhole.

There is also a 225mm diameter foul sewer in the grass verge on Orton Road that maybe a suitable connection point. However, this sewer is currently a private sewer which has been offered for adoption under the Section 104 process, therefore, if you wish to connect to this

sewer, you will need the permission of the owner of this asset to do so and confirmation that there is capacity within their network for the flows from your development.

Therefore, a connection to the public sewer (direct or indirect) is acceptable subject to a formal Section 106 sewer connection approval (see later.)

Surface Water Drainage

If following testing, it is demonstrated that soakaways would not be possible on the site; satisfactory evidence will need to be submitted from the SI consultant **(extract or a supplementary letter**).

If soakaways are not possible, there is a pond located within your site that you would need to investigate for the disposal of the surface water run-off, at a rate of 5 litres /second /hectare (greenfield rate). This would satisfy SGN1 (enclosed), in accordance with Warwickshire Council SUDS Policy as the Lead Local Flood Authority (LLFA) for the area and statutory consultee in the planning process. Please see the guidance notes attached for further information.

If it proven that the pond or other means of disposing surface water run-off is not achievable we would then consider a connection to the receiving 300mm diameter public surface water network at a rate of 5 litres /second /hectare (greenfield rate). The nearest connection point is to manhole 4251 located on the junction of Orton Road and Windmill Close (X- 428483, Y – 303274).

Subject to flows being agreed with the LLFA and Section 106 sewer connection application.

New Connections

For any new connections (including the re-use of existing connections) to the public sewerage system, the developer will need to submit Section 106 application forms. Our New Connections department are responsible for handling all such enquiries and applications. To contact them for an application form and associated guidance notes please call 0800 7076600 or you can download them from our website www.stwater.co.uk.

Please quote ref: 1138609 in any future correspondence (including e-mails) with STW Limited. Please note that ‘Development Enquiry’ responses are only valid for 6 months from the date of this letter.

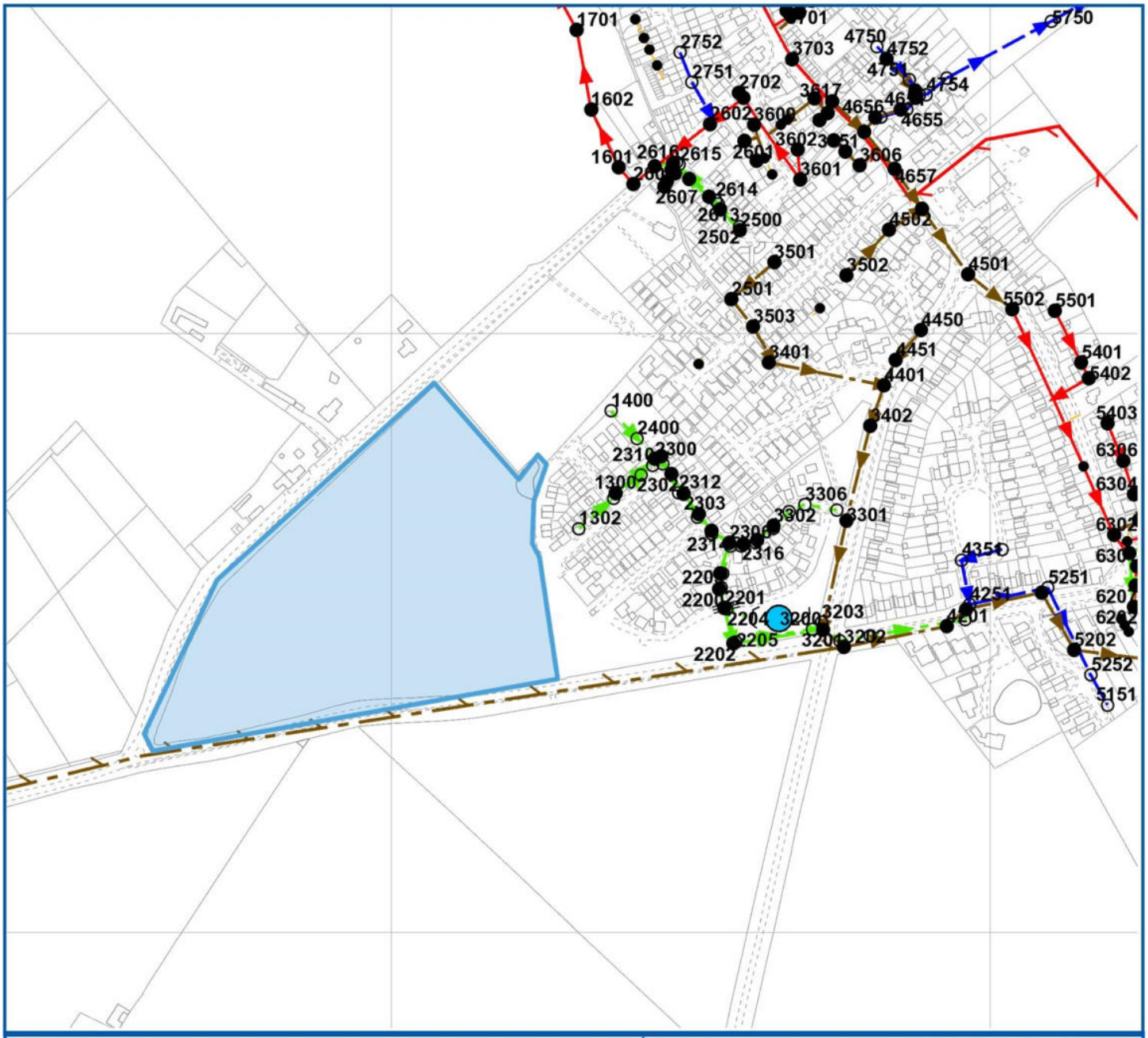
WONDERFUL ON TAP

SEVERN TRENT

Yours sincerely,

[redacted]

Jasveer Bullock (Mrs)
Network Solutions
Developer Services



LEGEND

Operational Site

Waste Water Pump
- Transferred Asset
- S24
- S104
- S102
- Null Private
- Null
- None
- Highway Drain
- Adopted Sewer

Storage
- Disposal Site
- Off-Line Waste Water Storage
- On-Line Waste Water Storage
- Wet Well

Waste Water Process Structure
- Sewage Treatment Point
- Sewage Treatment Structure
- Sludge Treatment Point
- Sludge Treatment Structure

Manhole
- Foul Bifurcation Manhole
- Combined Bifurcation Manhole
- Surface Water Bifurcation Manhole
- Dual Manhole
- Foul Single Manhole
- Combined Single Manhole
- Surface Water Single Manhole
- Twin Manhole
- Foul Adopted Manhole
- Combined Adopted Manhole
- Surface Adopted Manhole
- Transferred Manhole
- Unsurveyed Manhole

Gravity Sewer Pipe
- Foul Gravity Sewer
- Combined Gravity Sewer
- Surface Water Gravity Sewer
- S104 Surface Water Gravity Sewer
- S104 Combined Gravity Sewer
- S104 Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Transferred Surface Water Sewer
- Transferred Combined Sewer
- Transferred Foul Sewer
- Disposal Pipe
- Overflow Pipe
- Culverted Water Course
- Waste Internal Site Pipe
- Sewer Service Connection
- Gravity Sewer Others

Pressure Sewer Pipe
- Surface Water Pressure Sewer
- Combined Pressure Sewer
- Foul Pressure Sewer
- S104 Surface Water Pressure Sewer
- S104 Combined Pressure Sewer
- S104 Foul Pressure Sewer
- Private Surface Water Pressure Sewe
- Private Combined Pressure Sewer
- Private Foul Pressure Sewer
- Surface Water Vacuum Sewer
- Foul Vacuum Sewer
- Combined Vacuum Sewer
- S104 Surface Water Vacuum Sewer
- S104 Combined Vacuum Sewer
- S104 Foul Vacuum Sewer
- Private Surface Water Vaccum Sewer
- Private Combined Vacuum Sewer
- Private Foul Vacuum Sewer
- Surface Water Siphon
- Combined Siphon
- Foul Siphon
- Private Surface Water Siphon
- Private Combined Siphon
- Private Foul Siphon
- S104 Surface Water Siphon
- S104 Combined Siphon
- S104 Foul Siphon
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Disposal Pipe

Service Pipe
- Surface Water Lateral Drain
- Combined Lateral Drain
- Foul Lateral Drain
- S104 Surface Water Lateral Drain
- S104 Combined Lateral Drain
- S104 Foul Lateral Drain
- Private Surface Water Lateral Drain
- Private Combined Lateral Drain
- Private Foul Lateral Drain
- Transferred Surface Water Lateral Dra
- Transferred Combined Lateral Drain
- Transferred Foul Lateral Drain

Ancillary
- Balancing Lagoon
- Grease Trap
- Interceptor
- Screen

Chamber
- Flushing Chamber
- Scalaway
- Overflow

Fitting
- Blind Shaft
- Facility Connector
- Head Node
- Lamphole
- Sewerage Air Valve
- Sewerage Chemical Injection Point
- Sewerage Hatch Box
- Sewerage Pressure Washout
- Vent Column
- Waste Water Outfall

Control Valve
- Hydrobrake
- Penstock
- Sewerage Isolation Valve
- Sewerage Non Return Valve

Manhole Annotation
- Print500mLine

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD

O/S Map Scale: 1:5,000 **This map is centred upon:**

Date of Issue: 16-01-25 **X:** 428150.78 **Y:** 303346.72

Disclaimer Statement:

1 Do not scale off this Map.

2 This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

3 On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, Transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on the map.

5 Ordnance Survey licence number: **100031673**

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK28033304	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034450	<UNK>	<UNK>	<UNK>	F	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28033706	90.69	89.85	89.66	F	PVC	C	150	<UNK>	78.26	31/12/1899 00:00:00
SK28031956	81.15	79.43	78.94	S	VC	C	<UNK>	<UNK>	22.82	31/12/1899 00:00:00
SK28032904	84.6299	82.71	81.96	F	VC	C	150	<UNK>	22.35	31/12/1899 00:00:00
SK28032307	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033307	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28031957	81.7399	80.07	79.49	S	VC	C	<UNK>	<UNK>	30.5	31/12/1899 00:00:00
SK28034850	86.647	85.01	83.79	S	VC	C	225	<UNK>	17.1	31/12/1899 00:00:00
SK28033604	92.2699	91.85	91.57	F	VC	C	100	<UNK>	32.93	31/12/1899 00:00:00
SK28031902	81.6399	79.9	77.85	F	VC	C	<UNK>	<UNK>	21.57	31/12/1899 00:00:00
SK28033853	88.7969	87.1	86.54	S	VC	C	225	<UNK>	22.54	31/12/1899 00:00:00
SK28032301	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28036311	<UNK>	<UNK>	<UNK>	S	CO	<UNK>	1500	<UNK>	<UNK>	06/09/2022 00:00:00
SK28031857	80.29	78.96	77.14	S	VC	C	<UNK>	<UNK>	21.21	31/12/1899 00:00:00
SK28033601	88.5299	86.73	<UNK>	C	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28033704	90.94	90.36	<UNK>	C	VC	C	100	<UNK>	0	31/12/1899 00:00:00
SK28035502	83.0299	0	<UNK>	C	<UNK>	<UNK>	0	0	0	31/12/1899 00:00:00
SK28033607	88.9599	88.11	<UNK>	F	VC	C	100	<UNK>	0	31/12/1899 00:00:00
SK28032311	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032502	<UNK>	<UNK>	<UNK>	S	U	C	225	<UNK>	<UNK>	05/05/2021 00:00:00
SK28035351	77.75	76.36	75.38	S	VC	C	<UNK>	<UNK>	35.89	31/12/1899 00:00:00
SK28036313	<UNK>	<UNK>	<UNK>	F	P	<UNK>	150	<UNK>	<UNK>	06/09/2022 00:00:00
SK28033402	79.62	77.44	76.61	F	VC	C	<UNK>	<UNK>	98.54	31/12/1899 00:00:00
SK28036202	77.1399	76.2	<UNK>	C	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28036207	<UNK>	76.67	76.2	C	VC	C	225	<UNK>	71.969	31/12/1899 00:00:00
SK28034451	<UNK>	<UNK>	<UNK>	F	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28035201	76.9599	74.02	70.64	F	VC	C	<UNK>	<UNK>	16.29	31/12/1899 00:00:00
SK28032315	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28035403	81.6299	80.81	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28033616	92.15	91.28	<UNK>	F	VC	C	100	<UNK>	0	31/12/1899 00:00:00
SK28033851	90.4229	88.52	88.15	S	VC	C	225	<UNK>	37.41	31/12/1899 00:00:00
SK28035750	85.9599	84.23	80.54	S	CO	C	300	<UNK>	24.96	31/12/1899 00:00:00
SK28034200	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034202	76.7099	74.55	74.04	F	VC	C	<UNK>	<UNK>	126.55	31/12/1899 00:00:00
SK28033703	91.3899	90.17	<UNK>	C	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK28033503	83.87	82.52	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032605	<UNK>	<UNK>	<UNK>	F	VC	C	150	<UNK>	<UNK>	05/05/2021 00:00:00
SK28034652	90.8899	89.37	89.21	S	VC	C	150	<UNK>	141.75	31/12/1899 00:00:00
SK28032610	<UNK>	<UNK>	83.27	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28035252	74.8899	74.08	73.86	S	CO	C	<UNK>	<UNK>	130.23	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK28032615	<UNK>	<UNK>	<UNK>	S	U	C	225	<UNK>	<UNK>	05/05/2021 00:00:00
SK28032312	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28031819	82.61	81.2	80.53	F	VC	C	150	<UNK>	23.88	31/12/1899 00:00:00
SK28033609	89.0599	87.51	<UNK>	F	VC	C	100	<UNK>	0	31/12/1899 00:00:00
SK28031801	79.3	77.98	<UNK>	F	VC	C	100	<UNK>	0	31/12/1899 00:00:00
SK28032752	85.73	83.8	83.48	S	VC	C	<UNK>	<UNK>	84.16	31/12/1899 00:00:00
SK28032308	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032906	83.8499	81.95	80.82	F	VC	C	<UNK>	<UNK>	50.19	31/12/1899 00:00:00
SK28032316	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033204	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033750	89.623	88.8	88.73	S	VC	C	225	<UNK>	228.14	31/12/1899 00:00:00
SK28031805	80.1999	79.17	78.9	F	VC	C	100	<UNK>	33.56	31/12/1899 00:00:00
SK28031909	81.3199	79.48	76.57	F	VC	C	<UNK>	<UNK>	25.02	31/12/1899 00:00:00
SK28031806	80.1299	78.91	78.1	F	VC	C	100	<UNK>	46.85	31/12/1899 00:00:00
SK28034751	91.36	88.35	88.24	S	VC	C	225	<UNK>	153.55	31/12/1899 00:00:00
SK28031601	83.4599	81.55	78.01	C	VC	C	300	<UNK>	15.41	31/12/1899 00:00:00
SK28033650	90.68	88.33	86.99	F	VC	C	150	<UNK>	29.896	31/12/1899 00:00:00
SK28033605	91.72	91.25	90.567	F	VC	C	100	0	19.68	31/12/1899 00:00:00
SK28031851	78.5199	76.67	74.76	S	VC	C	225	<UNK>	9.93	31/12/1899 00:00:00
SK28033401	82.7099	78.6	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28032600	<UNK>	<UNK>	<UNK>	C	VC	C	225	<UNK>	<UNK>	05/05/2021 00:00:00
SK28034657	88.1299	86.67	84.28	F	VC	C	225	<UNK>	16.5	31/12/1899 00:00:00
SK28031815	80.6399	78.82	<UNK>	C	VC	C	300	<UNK>	0	31/12/1899 00:00:00
SK28033617	91.55	90.72	<UNK>	F	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK28032202	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033603	92.2099	91.55	91.29	F	VC	C	100	<UNK>	65.5	31/12/1899 00:00:00
SK28031808	82.4899	81.14	80.87	F	VC	C	100	<UNK>	33.33	31/12/1899 00:00:00
SK28033301	79.08	76.6	75.81	F	VC	C	225	<UNK>	108.24	31/12/1899 00:00:00
SK28031907	80.12	<UNK>	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28031852	79.26	77.65	76.84	S	VC	C	150	<UNK>	54.51	31/12/1899 00:00:00
SK28031952	80.5999	79.55	79.06	S	VC	C	<UNK>	<UNK>	69.31	31/12/1899 00:00:00
SK28032304	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032911	87.5	86.89	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28034650	91.1999	88.23	88.21	S	CO	C	300	<UNK>	255	31/12/1899 00:00:00
SK28031817	78.3499	77.2	74.63	C	VC	C	225	<UNK>	21.79	31/12/1899 00:00:00
SK28032908	83.55	82.73	79.54	F	VC	C	<UNK>	<UNK>	10.79	31/12/1899 00:00:00
SK28031300	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032305	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034753	91.26	88.96	88.88	F	VC	C	150	<UNK>	76.5	31/12/1899 00:00:00
SK28032309	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032801	82.98	81.9	81.24	F	VC	C	<UNK>	<UNK>	28.59	31/12/1899 00:00:00
SK28034952	79.871	78.39	78.2	S	VC	C	<UNK>	<UNK>	21.47	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK28032205	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034201	76.8399	74.84	74.71	F	VC	C	225	<UNK>	179.62	31/12/1899 00:00:00
SK28032607	83.6399	83.4	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28036201	<UNK>	<UNK>	<UNK>	C	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032803	85.12	82.09	81.42	C	VC	C	<UNK>	<UNK>	24.06	31/12/1899 00:00:00
SK28032804	88.69	88.18	<UNK>	C	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK28032606	83.98	83.24	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28031301	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28031822	79.1999	75.85	<UNK>	C	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28032611	<UNK>	<UNK>	<UNK>	F	VC	C	150	<UNK>	<UNK>	05/05/2021 00:00:00
SK28034752	91.22	89.25	88.98	F	VC	C	150	<UNK>	153.48	31/12/1899 00:00:00
SK28033602	90.72	90.09	86.76	C	VC	C	100	<UNK>	7.53	31/12/1899 00:00:00
SK28032313	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034755	90.73	87.94	84.27	S	CO	C	300	<UNK>	25.45	31/12/1899 00:00:00
SK28033850	90.146	88.72	88.54	S	VC	C	225	<UNK>	96.89	31/12/1899 00:00:00
SK28032501	83.8099	82.91	82.53	F	VC	C	<UNK>	<UNK>	76.87	31/12/1899 00:00:00
SK28032608	87.29	85.43	<UNK>	C	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28034351	76.9199	75.35	75.12	S	VC	C	<UNK>	<UNK>	163.74	31/12/1899 00:00:00
SK28034501	83.73	82.59	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28036300	<UNK>	<UNK>	<UNK>	F	VC	C	150	<UNK>	<UNK>	31/12/1899 00:00:00
SK28034602	85.0999	84.11	82.62	F	VC	C	225	<UNK>	45.25	31/12/1899 00:00:00
SK28032302	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032609	<UNK>	<UNK>	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032901	82.65	81.96	81.04	F	VC	C	<UNK>	<UNK>	15.57	31/12/1899 00:00:00
SK28033901	86.79	85.21	84.22	F	VC	C	<UNK>	<UNK>	10.93	31/12/1899 00:00:00
SK28032613	<UNK>	<UNK>	<UNK>	S	U	C	225	<UNK>	<UNK>	05/05/2021 00:00:00
SK28034654	91.18	88.86	88.75	F	VC	C	150	<UNK>	147.55	31/12/1899 00:00:00
SK28032310	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28036307	<UNK>	<UNK>	<UNK>	C	U	U	0	0	0	31/12/1899 00:00:00
SK28033608	88.6999	88.18	88.11	F	VC	C	100	<UNK>	95.86	31/12/1899 00:00:00
SK28031855	80.1399	78.8	78.55	S	VC	C	100	<UNK>	41.76	31/12/1899 00:00:00
SK28035501	83.75	82.88	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28031901	81.6299	81.01	79.94	F	VC	C	100	<UNK>	5.56	31/12/1899 00:00:00
SK28036303	79.48	<UNK>	<UNK>	C	U	U	0	0	0	31/12/1899 00:00:00
SK28033201	77.11	75.81	75.6	F	VC	C	225	<UNK>	140.05	31/12/1899 00:00:00
SK28030801	76.75	74.59	<UNK>	C	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28031814	78.83	77.56	<UNK>	C	VC	C	300	<UNK>	0	31/12/1899 00:00:00
SK28032812	89.04	<UNK>	<UNK>	C	VC	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28033707	90.8799	89.94	89.86	F	PVC	C	150	<UNK>	170	31/12/1899 00:00:00
SK28034950	84.216	82.52	78.58	S	VC	C	225	<UNK>	12.57	31/12/1899 00:00:00
SK28033902	86.55	84.21	83.41	F	VC	C	<UNK>	<UNK>	46.53	31/12/1899 00:00:00
SK28033701	90.79	90.43	90.38	C	VC	C	100	<UNK>	128	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK28033855	90.2009	88.41	<UNK>	F	VC	C	150	<UNK>	0.35	31/12/1899 00:00:00
SK28031818	81.5299	79.71	78.83	C	VC	C	300	<UNK>	11.36	31/12/1899 00:00:00
SK28034851	85.1119	83.75	82.55	S	VC	C	225	<UNK>	17.32	31/12/1899 00:00:00
SK28032910	86.7699	85.34	84.6	C	VC	C	300	<UNK>	21.66	31/12/1899 00:00:00
SK28031853	78.87	77.05	76.7	S	VC	C	225	<UNK>	48.83	31/12/1899 00:00:00
SK28031854	81.62	80.64	80.44	S	VC	C	100	<UNK>	57	31/12/1899 00:00:00
SK28032802	83.2399	80.37	<UNK>	C	VC	C	300	<UNK>	0	31/12/1899 00:00:00
SK28031302	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034655	90.0299	88.73	88.54	F	VC	C	150	<UNK>	117.53	31/12/1899 00:00:00
SK28031400	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033205	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034750	91.15	88.58	88.36	S	VC	C	225	<UNK>	173.64	31/12/1899 00:00:00
SK28033903	85.4199	83.35	83.15	F	VC	C	150	<UNK>	107.7	31/12/1899 00:00:00
SK28033305	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032603	83.5	82.1	81.94	C	VC	C	300	<UNK>	146.44	31/12/1899 00:00:00
SK28034251	76.72	75.07	74.73	S	VC	C	<UNK>	<UNK>	195.56	31/12/1899 00:00:00
SK28031602	80.8199	77.97	76.67	C	VC	C	225	<UNK>	51.6	31/12/1899 00:00:00
SK28032616	<UNK>	<UNK>	<UNK>	S	U	C	225	<UNK>	<UNK>	05/05/2021 00:00:00
SK28032317	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033854	88.2519	86.42	85.06	S	VC	C	225	<UNK>	25.82	31/12/1899 00:00:00
SK28033300	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033852	90.3359	88.23	87.13	S	VC	C	225	<UNK>	36.12	31/12/1899 00:00:00
SK28033502	85.83	84.92	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28031858	81.29	80.41	79.02	S	VC	C	150	<UNK>	15.29	31/12/1899 00:00:00
SK28036208	<UNK>	<UNK>	<UNK>	F	P	<UNK>	150	<UNK>	<UNK>	16/08/2023 00:00:00
SK28036310	<UNK>	<UNK>	<UNK>	S	CO	<UNK>	600	<UNK>	<UNK>	06/09/2022 00:00:00
SK28036304	79.9899	79.16	79.13	C	VC	C	<UNK>	<UNK>	210.67	31/12/1899 00:00:00
SK28031905	80.9199	79.85	79	F	VC	C	<UNK>	<UNK>	46.94	31/12/1899 00:00:00
SK28032300	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28036400	<UNK>	<UNK>	<UNK>	S	CO	<UNK>	1500	<UNK>	<UNK>	06/09/2022 00:00:00
SK28033705	90.93	89.64	<UNK>	F	VC	C	150	<UNK>	0	31/12/1899 00:00:00
SK28032751	85.8799	83.46	<UNK>	S	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032601	88.8399	88.43	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28030851	76.2699	74.74	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28032400	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28031856	79.73	78.54	77.66	S	VC	C	100	<UNK>	30.91	31/12/1899 00:00:00
SK28032902	82.65	81.51	79.92	F	VC	C	<UNK>	<UNK>	13.33	31/12/1899 00:00:00
SK28031803	79.8499	78.46	78.07	F	VC	C	100	<UNK>	36.72	31/12/1899 00:00:00
SK28036306	81.04	<UNK>	79.16	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032612	<UNK>	<UNK>	<UNK>	F	VC	C	150	<UNK>	<UNK>	05/05/2021 00:00:00
SK28031802	79.36	78.07	<UNK>	F	VC	C	100	<UNK>	0	31/12/1899 00:00:00
SK28032314	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK28033306	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034502	<UNK>	<UNK>	84.16	F	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28031820	81.7699	80.5	79.94	F	VC	C	<UNK>	<UNK>	66.09	31/12/1899 00:00:00
SK28032951	82.4	80.46	79.32	S	VC	C	100	<UNK>	20.03	31/12/1899 00:00:00
SK28033302	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032905	84.7399	<UNK>	82.01	F	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032203	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033501	85.22	84.23	82.9	F	VC	C	150	<UNK>	35.23	31/12/1899 00:00:00
SK28032909	86.8099	84.58	83.4	C	VC	C	300	<UNK>	19.51	31/12/1899 00:00:00
SK28032602	85.29	83.51	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28034656	90.7799	88.52	88.38	F	VC	C	150	<UNK>	113.07	31/12/1899 00:00:00
SK28036312	<UNK>	<UNK>	<UNK>	F	P	<UNK>	150	<UNK>	<UNK>	06/09/2022 00:00:00
SK28031951	77.9199	76.22	<UNK>	S	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28031908	81.4599	80.66	79.95	F	VC	C	<UNK>	<UNK>	30.89	31/12/1899 00:00:00
SK28032303	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032952	83.5	82.64	79.52	S	VC	C	100	<UNK>	9.34	31/12/1899 00:00:00
SK28036401	<UNK>	<UNK>	<UNK>	S	CO	<UNK>	1500	<UNK>	<UNK>	06/09/2022 00:00:00
SK28032907	85.4199	84.78	82.89	F	VC	C	<UNK>	<UNK>	14.9	31/12/1899 00:00:00
SK28031904	79.4899	77.8	76.55	F	VC	C	<UNK>	<UNK>	29.09	31/12/1899 00:00:00
SK28035402	82.5	0	0	C	<UNK>	<UNK>	0	0	0	31/12/1899 00:00:00
SK28032614	<UNK>	<UNK>	<UNK>	S	CC	R	600	2100	<UNK>	05/05/2021 00:00:00
SK28034951	80.231	78.54	78.4	S	VC	C	225	<UNK>	53.57	31/12/1899 00:00:00
SK28036301	77.8	76.67	76.2	C	VC	C	225	<UNK>	71.969	31/12/1899 00:00:00
SK28032903	85.23	83.12	82.77	F	VC	C	150	<UNK>	148.2	31/12/1899 00:00:00
SK28035251	77.0299	74.7	74.11	S	VC	C	300	<UNK>	137.95	31/12/1899 00:00:00
SK28032500	<UNK>	<UNK>	<UNK>	F	VC	C	150	<UNK>	<UNK>	05/05/2021 00:00:00
SK28032702	87.4199	86.07	85.7	C	VC	C	150	<UNK>	19.49	31/12/1899 00:00:00
SK28031953	81.3399	79.45	78.99	S	VC	C	150	<UNK>	27.5	31/12/1899 00:00:00
SK28032604	83.1999	81.94	81.58	C	VC	C	<UNK>	<UNK>	51.22	31/12/1899 00:00:00
SK28036302	78.97	77.9	<UNK>	C	VC	C	225	0	0.11	31/12/1899 00:00:00
SK28031955	80.93	79.32	79.27	S	VC	C	<UNK>	<UNK>	553.2	31/12/1899 00:00:00
SK28031903	80.3199	79.67	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28033303	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28035202	72.61	70.62	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28032953	82.3499	<UNK>	80.47	S	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032306	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033203	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034651	91.0899	89.14	88.24	S	VC	C	225	<UNK>	18.23	31/12/1899 00:00:00
SK28033651	<UNK>	90.567	89.73	F	VC	C	100	<UNK>	19.7	31/12/1899 00:00:00
SK28031809	81.86	80.87	<UNK>	F	VC	C	100	<UNK>	0	31/12/1899 00:00:00
SK28031954	80.9899	78.91	76.28	S	VC	C	150	<UNK>	23.45	31/12/1899 00:00:00
SK28032201	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK28034754	91.3399	88.2	88.05	S	CO	C	300	<UNK>	147	31/12/1899 00:00:00
SK28036305	79.98	79.12	78.61	C	VC	C	<UNK>	<UNK>	41.22	31/12/1899 00:00:00
SK28033606	90.62	89.71	<UNK>	F	VC	C	100	<UNK>	0	31/12/1899 00:00:00
SK28033702	89.25	87.99	<UNK>	C	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28031910	77.93	76.51	74.71	F	VC	C	<UNK>	<UNK>	45.59	31/12/1899 00:00:00
SK28031701	80.0599	76.65	75.88	C	VC	C	225	<UNK>	103.44	31/12/1899 00:00:00
SK28034401	79.8799	77.67	77.45	F	VC	C	225	<UNK>	162.95	31/12/1899 00:00:00
SK28035401	82.5999	<UNK>	81.62	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032204	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032204	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033202	76.71	75.6	74.86	F	VC	C	225	<UNK>	118.73	31/12/1899 00:00:00
SK28033200	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033200	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032200	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
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<UNK>	<UNK>	<UNK>	<UNK>	C	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
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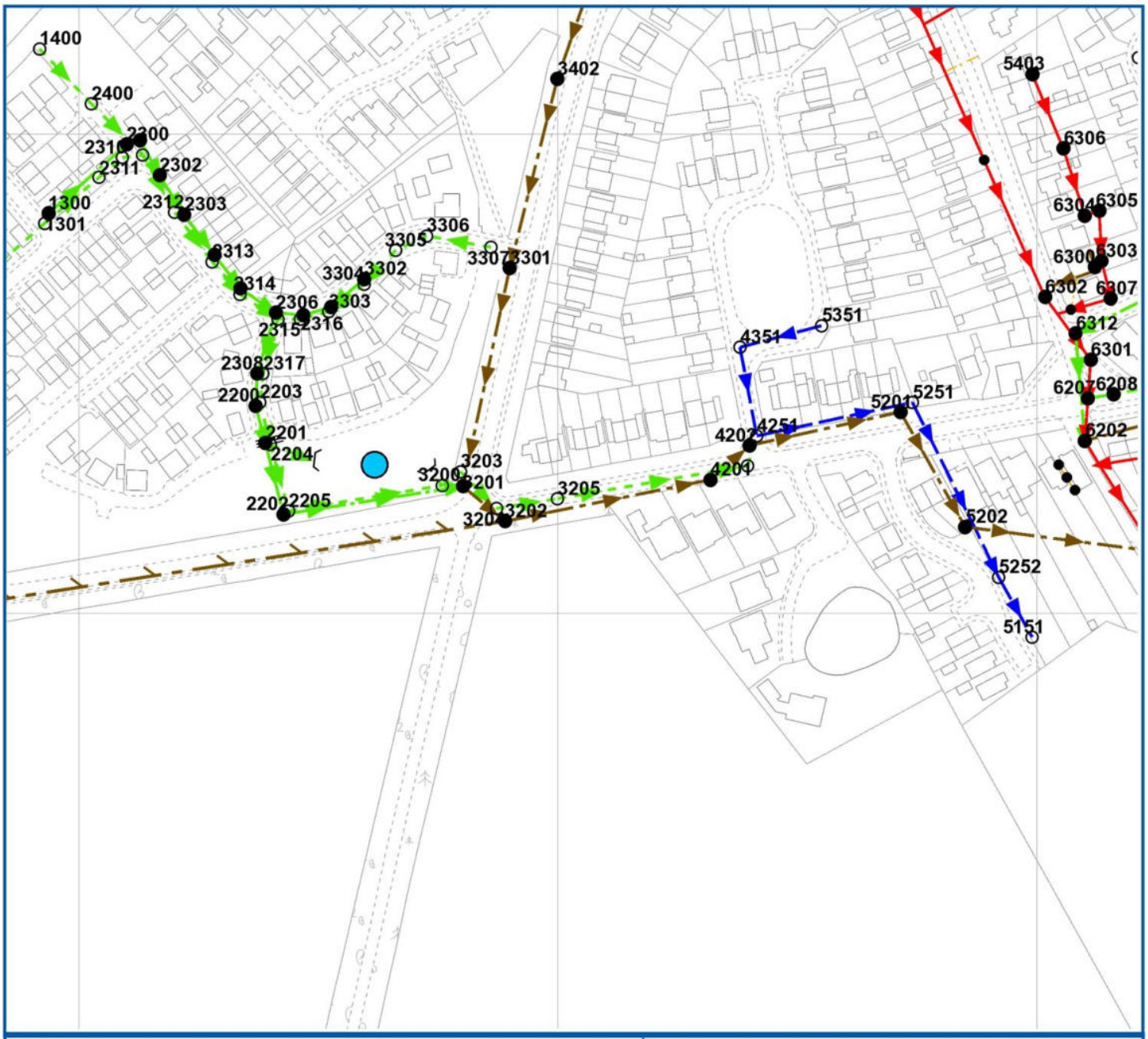


LEGEND

Operational Site

Waste Water Pump
- Transferred Asset
- S24
- S104
- S102
- Null Private
- Null
- None
- Highway Drain
- Adopted Sewer

Storage
- Disposal Site
- Off-Line Waste Water Storage
- On-Line Waste Water Storage
- Wet Well

Waste Water Process Structure
- Sewage Treatment Point
- Sewage Treatment Structure
- Sludge Treatment Point
- Sludge Treatment Structure

Manhole
- Foul Bifurcation Manhole
- Combined Bifurcation Manhole
- Surface Water Bifurcation Manhole
- Dual Manhole
- Foul Single Manhole
- Combined Single Manhole
- Surface Water Single Manhole
- Twin Manhole
- Foul Adopted Manhole
- Combined Adopted Manhole
- Surface Adopted Manhole
- Transferred Manhole
- Unsurveyed Manhole

Gravity Sewer Pipe
- Foul Gravity Sewer
- Combined Gravity Sewer
- Surface Water Gravity Sewer
- S104 Surface Water Gravity Sewer
- S104 Combined Gravity Sewer
- S104 Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Transferred Surface Water Sewer
- Transferred Combined Sewer
- Transferred Foul Sewer
- Disposal Pipe
- Overflow Pipe
- Culverted Water Course
- Waste Internal Site Pipe
- Sewer Service Connection
- Gravity Sewer Others

Pressure Sewer Pipe
- Surface Water Pressure Sewer
- Combined Pressure Sewer
- Foul Pressure Sewer
- S104 Surface Water Pressure Sewer
- S104 Combined Pressure Sewer
- S104 Foul Pressure Sewer
- Private Surface Water Pressure Sewe
- Private Combined Pressure Sewer
- Private Foul Pressure Sewer
- Surface Water Vacuum Sewer
- Foul Vacuum Sewer
- Combined Vacuum Sewer
- S104 Surface Water Vacuum Sewer
- S104 Combined Vacuum Sewer
- S104 Foul Vacuum Sewer
- Private Surface Water Vaccum Sewer
- Private Combined Vacuum Sewer
- Private Foul Vacuum Sewer
- Surface Water Siphon
- Combined Siphon
- Foul Siphon
- Private Surface Water Siphon
- Private Combined Siphon
- Private Foul Siphon
- S104 Surface Water Siphon
- S104 Combined Siphon
- S104 Foul Siphon
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Disposal Pipe

Service Pipe
- Surface Water Lateral Drain
- Combined Lateral Drain
- Foul Lateral Drain
- S104 Surface Water Lateral Drain
- S104 Combined Lateral Drain
- S104 Foul Lateral Drain
- Private Surface Water Lateral Drain
- Private Combined Lateral Drain
- Private Foul Lateral Drain
- Transferred Surface Water Lateral Dra
- Transferred Combined Lateral Drain
- Transferred Foul Lateral Drain

Pressure Sewer Annotation

Gravity Sewer Annotation

Service Sewer Annotation

Ancillary
- Balancing Lagoon
- Grease Trap
- Interceptor
- Screen

Chamber
- Flushing Chamber
- Scalaway
- Overflow

Fitting
- Blind Shaft
- Facility Connector
- Head Node
- Lamphole
- Sewerage Air Valve
- Sewerage Chemical Injection Point
- Sewerage Hatch Box
- Sewerage Pressure Washout
- Vent Column
- Waste Water Outfall

Control Valve
- Hydrobrake
- Penstock
- Sewerage Isolation Valve
- Sewerage Non Return Valve

Manhole Annotation

Print200mLine

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD

O/S Map Scale: 1:2,500

This map is centred upon:

Date of Issue: 16-01-25

X: 428405.84 **Y:** 303239.64

Disclaimer Statement:

1 Do not scale off this Map.

2 This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

3 On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, Transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on the map.

5 Ordnance Survey licence number: **100031673**

6 Document users other than SEVERN TRENT WATER business users are advised that this document is provided for reference purpose only and is subject to copyright, therefore, no further copies should be made from it.

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK28035252	74.8899	74.08	73.86	S	CO	C	<UNK>	<UNK>	130.23	31/12/1899 00:00:00
SK28032312	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034200	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034202	76.7099	74.55	74.04	F	VC	C	<UNK>	<UNK>	126.55	31/12/1899 00:00:00
SK28033503	83.87	82.52	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28033304	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034450	<UNK>	<UNK>	<UNK>	F	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032307	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033307	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032301	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28036311	<UNK>	<UNK>	<UNK>	S	CO	<UNK>	1500	<UNK>	<UNK>	06/09/2022 00:00:00
SK28035502	83.0299	0	<UNK>	C	<UNK>	<UNK>	0	0	0	31/12/1899 00:00:00
SK28032311	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28035351	77.75	76.36	75.38	S	VC	C	<UNK>	<UNK>	35.89	31/12/1899 00:00:00
SK28036313	<UNK>	<UNK>	<UNK>	F	P	<UNK>	150	<UNK>	<UNK>	06/09/2022 00:00:00
SK28033402	79.62	77.44	76.61	F	VC	C	<UNK>	<UNK>	98.54	31/12/1899 00:00:00
SK28036202	77.1399	76.2	<UNK>	C	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28036207	<UNK>	76.67	76.2	C	VC	C	225	<UNK>	71.969	31/12/1899 00:00:00
SK28034451	<UNK>	<UNK>	<UNK>	F	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28035201	76.9599	74.02	70.64	F	VC	C	<UNK>	<UNK>	16.29	31/12/1899 00:00:00
SK28035403	81.6299	80.81	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032315	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032308	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032316	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033204	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033401	82.7099	78.6	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28032202	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034401	79.8799	77.67	77.45	F	VC	C	225	<UNK>	162.95	31/12/1899 00:00:00
SK28035401	82.5999	<UNK>	81.62	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28033202	76.71	75.6	74.86	F	VC	C	225	<UNK>	118.73	31/12/1899 00:00:00
SK28032204	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032204	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032501	83.8099	82.91	82.53	F	VC	C	<UNK>	<UNK>	76.87	31/12/1899 00:00:00
SK28034351	76.9199	75.35	75.12	S	VC	C	<UNK>	<UNK>	163.74	31/12/1899 00:00:00
SK28034501	83.73	82.59	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28036300	<UNK>	<UNK>	<UNK>	F	VC	C	150	<UNK>	<UNK>	31/12/1899 00:00:00
SK28032302	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032310	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28036307	<UNK>	<UNK>	<UNK>	C	U	U	0	0	0	31/12/1899 00:00:00
SK28035501	83.75	82.88	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28036303	79.48	<UNK>	<UNK>	C	U	U	0	0	0	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK28033201	77.11	75.81	75.6	F	VC	C	225	<UNK>	140.05	31/12/1899 00:00:00
SK28033301	79.08	76.6	75.81	F	VC	C	225	<UNK>	108.24	31/12/1899 00:00:00
SK28032304	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28031301	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28031300	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032305	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033200	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033200	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032200	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28031302	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28031400	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033205	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033305	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034251	76.72	75.07	74.73	S	VC	C	<UNK>	<UNK>	195.56	31/12/1899 00:00:00
SK28032317	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033300	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033502	85.83	84.92	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28036208	<UNK>	<UNK>	<UNK>	F	P	<UNK>	150	<UNK>	<UNK>	16/08/2023 00:00:00
SK28036310	<UNK>	<UNK>	<UNK>	S	CO	<UNK>	600	<UNK>	<UNK>	06/09/2022 00:00:00
SK28036304	79.9899	79.16	79.13	C	VC	C	<UNK>	<UNK>	210.67	31/12/1899 00:00:00
SK28036400	<UNK>	<UNK>	<UNK>	S	CO	<UNK>	1500	<UNK>	<UNK>	06/09/2022 00:00:00
SK28032300	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032400	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28036306	81.04	<UNK>	79.16	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28033306	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032314	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033302	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032203	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033501	85.22	84.23	82.9	F	VC	C	150	<UNK>	35.23	31/12/1899 00:00:00
SK28036312	<UNK>	<UNK>	<UNK>	F	P	<UNK>	150	<UNK>	<UNK>	06/09/2022 00:00:00
SK28032303	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28036401	<UNK>	<UNK>	<UNK>	S	CO	<UNK>	1500	<UNK>	<UNK>	06/09/2022 00:00:00
SK28035402	82.5	0	0	C	<UNK>	<UNK>	0	0	0	31/12/1899 00:00:00
SK28036301	77.8	76.67	76.2	C	VC	C	225	<UNK>	71.969	31/12/1899 00:00:00
SK28035251	77.0299	74.7	74.11	S	VC	C	300	<UNK>	137.95	31/12/1899 00:00:00
SK28036302	78.97	77.9	<UNK>	C	VC	C	225	0	0.11	31/12/1899 00:00:00
SK28033303	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28035202	72.61	70.62	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SK28032306	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28033203	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28032201	<UNK>	<UNK>	<UNK>	F	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28036305	79.98	79.12	78.61	C	VC	C	<UNK>	<UNK>	41.22	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SK28032309	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28034201	76.8399	74.84	74.71	F	VC	C	225	<UNK>	179.62	31/12/1899 00:00:00
SK28032205	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
SK28036201	<UNK>	<UNK>	<UNK>	C	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SK28032313	<UNK>	<UNK>	<UNK>	S	U	C	<UNK>	<UNK>	<UNK>	05/12/2019 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	C	VC	<UNK>	<UNK>	<UNK>	<UNK>	20/11/2024 00:00:00

APPENDIX D – Drainage Strategy Drawing No. OR-LINK-GEN-XX-DR-C-0500 & Supporting Calculation

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	James Hall
Site name:	LE25058
Site location:	Orton Road

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	52.62666° N
Longitude:	1.58813° W
Reference:	4031752180
Date:	Feb 25 2025 15:29

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	5.66

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	630	630
Hydrological region:	4	4
Growth curve factor 1 year:	0.83	0.83
Growth curve factor 30 years:	2	2
Growth curve factor 100 years:	2.57	2.57
Growth curve factor 200 years:	3.04	3.04

Notes

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

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

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

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

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	24.16	24.16
1 in 1 year (l/s):	20.05	20.05
1 in 30 years (l/s):	48.31	48.31
1 in 100 year (l/s):	62.08	62.08
1 in 200 years (l/s):	73.44	73.44

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	9.900
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.129	5.00	86.500	1200	427892.174	303270.266	1.425
2	0.104	5.00	85.400	1200	427917.731	303264.042	1.500
3	0.094	5.00	84.100	1200	427941.181	303207.189	1.425
4	0.088	5.00	84.100	1200	427943.755	303240.705	1.713
5	0.188	5.00	84.800	1200	427934.712	303328.469	1.500
6	0.078	5.00	83.300	1200	427973.916	303280.080	1.600
7	0.111	5.00	83.000	1200	427978.262	303269.544	1.800
8	0.094	5.00	83.100	1200	428003.089	303382.779	1.425
9	0.178	5.00	82.100	1200	428033.663	303345.256	1.500
10	0.158	5.00	81.950	1200	428039.546	303328.903	1.625
11	0.221	5.00	80.650	1200	428083.769	303296.349	1.625
12	0.091	5.00	81.750	1200	428037.110	303302.729	1.575
13	0.082	5.00	81.500	1200	428028.965	303265.985	1.675
14	0.024	5.00	81.300	1200	428029.701	303245.491	1.575
SW2-1	0.259	5.00	80.700	1200	428046.087	303219.678	1.025
Pond			79.500		428091.388	303230.334	2.000
16_FC			79.400	1800	428117.422	303210.992	2.046
Outfall			79.081	1200	428127.886	303204.071	1.801
SW1-1			79.750		428096.541	303292.586	0.800
SW1-2			79.550		428095.831	303241.660	0.740
SW2-2			80.350		428079.205	303229.303	0.775

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	26.304	0.600	85.075	83.975	1.100	23.9	225	5.16	34.9
1.001	2	4	34.955	0.600	83.900	82.475	1.425	24.5	300	5.35	34.5
2.000	3	4	33.615	0.600	82.675	82.475	0.200	168.1	300	5.46	34.2
1.002	4	7	44.971	0.600	82.387	81.275	1.112	40.4	375	5.73	33.5
3.000	5	6	62.277	0.600	83.300	81.700	1.600	38.9	300	5.41	34.3
3.001	6	7	11.397	0.600	81.700	81.425	0.275	41.4	375	5.48	34.1

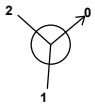
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	2.686	106.8	16.3	1.200	1.200	0.129	0.0
1.001	3.187	225.3	29.0	1.200	1.325	0.233	0.0
2.000	1.210	85.5	11.6	1.125	1.325	0.094	0.0
1.002	2.856	315.4	50.1	1.338	1.350	0.415	0.0
3.000	2.527	178.6	23.2	1.200	1.300	0.188	0.0
3.001	2.821	311.6	32.8	1.225	1.200	0.266	0.0

Links

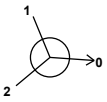
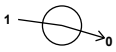
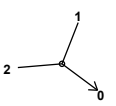
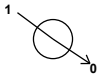
Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.003	7	13	50.828	0.600	81.200	79.825	1.375	37.0	450	5.98	32.8
4.000	8	9	48.402	0.600	81.675	80.835	0.840	57.6	225	5.47	34.1
4.001	9	10	17.379	0.600	80.600	80.325	0.275	63.2	450	5.58	33.8
4.002	10	12	26.287	0.600	80.325	80.175	0.150	175.2	450	5.87	33.1
4.004	11	SW1-1	13.315	0.600	79.025	78.950	0.075	177.5	375	6.28	32.1
4.006	SW1-2	Pond	12.166	0.030	78.810	77.500	1.310	9.3	525	7.09	30.2
1.004	13	14	20.507	0.600	79.825	79.725	0.100	205.1	525	6.20	32.3
1.005	14	SW2-1	30.575	0.600	79.725	79.675	0.050	611.5	525	6.76	30.9
1.006	SW2-1	SW2-2	28.000	0.030	79.675	79.575	0.100	280.0	675	7.23	29.9
1.008_1	Pond	16_FC	32.433	0.030	77.500	77.434	0.066	491.4	675	8.46	27.6
1.008	16_FC	Outfall	12.546	0.600	77.354	77.280	0.074	169.5	225	8.67	28.6
4.005	SW1-1	SW1-2	42.000	0.030	78.950	78.810	0.140	300.0	650	7.02	30.4
4.003	12	11	47.093	0.600	80.175	79.025	1.150	41.0	450	6.11	32.5
1.007	SW2-2	Pond	12.227	0.030	79.575	77.500	2.075	5.9	525	7.29	29.8

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.003	3.352	533.1	93.9	1.350	1.225	0.792	0.0
4.000	1.726	68.6	11.6	1.200	1.040	0.094	0.0
4.001	2.560	407.2	33.2	1.050	1.175	0.272	0.0
4.002	1.532	243.7	51.4	1.175	1.125	0.430	0.0
4.004	1.356	149.8	85.9	1.250	0.425	0.741	0.0
4.006	2.825	611.5	80.9	0.215	1.475	0.741	0.0
1.004	1.560	337.7	101.9	1.150	1.050	0.874	0.0
1.005	0.898	194.5	100.4	1.050	0.500	0.898	0.0
1.006	1.003	1709.8	125.1	0.350	0.100	1.157	0.0
1.008_1	0.459	164.3	189.3	1.325	1.291	1.898	0.0
1.008	1.001	39.8	196.1	1.821	1.576	1.898	0.0
4.005	0.947	1508.7	81.3	0.150	0.090	0.741	0.0
4.003	3.184	506.4	61.1	1.125	1.175	0.521	0.0
1.007	3.547	767.7	124.6	0.250	1.475	1.157	0.0

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	427892.174	303270.266	86.500	1.425	1200				
						0	1.000	85.075	225
2	427917.731	303264.042	85.400	1.500	1200	1	1.000	83.975	225
									
						0	1.001	83.900	300
3	427941.181	303207.189	84.100	1.425	1200				
						0	2.000	82.675	300
4	427943.755	303240.705	84.100	1.713	1200	1	2.000	82.475	300
							2	1.001	82.475	300
						0	1.002	82.387	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
5	427934.712	303328.469	84.800	1.500	1200				
						0	3.000	83.300	300
6	427973.916	303280.080	83.300	1.600	1200		1	3.000	81.700	300
						0	3.001	81.700	375
7	427978.262	303269.544	83.000	1.800	1200		1	3.001	81.425	375
							2	1.002	81.275	375
						0	1.003	81.200	450
8	428003.089	303382.779	83.100	1.425	1200				
						0	4.000	81.675	225
9	428033.663	303345.256	82.100	1.500	1200		1	4.000	80.835	225
						0	4.001	80.600	450
10	428039.546	303328.903	81.950	1.625	1200		1	4.001	80.325	450
						0	4.002	80.325	450
11	428083.769	303296.349	80.650	1.625	1200		1	4.003	79.025	450
						0	4.004	79.025	375
12	428037.110	303302.729	81.750	1.575	1200		1	4.002	80.175	450
						0	4.003	80.175	450
13	428028.965	303265.985	81.500	1.675	1200		1	1.003	79.825	450
						0	1.004	79.825	525
14	428029.701	303245.491	81.300	1.575	1200		1	1.004	79.725	525
						0	1.005	79.725	525
SW2-1	428046.087	303219.678	80.700	1.025	1200		1	1.005	79.675	525
						0	1.006	79.675	675
Pond	428091.388	303230.334	79.500	2.000			1	4.006	77.500	525
							2	1.007	77.500	525
						0	1.008_1	77.500	675
16_FC	428117.422	303210.992	79.400	2.046	1800		1	1.008_1	77.434	675
						0	1.008	77.354	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Outfall	428127.886	303204.071	79.081	1.801	1200	1	1.008	77.280	225
SW1-1	428096.541	303292.586	79.750	0.800		1	4.004	78.950	375
						0	4.005	78.950	650
SW1-2	428095.831	303241.660	79.550	0.740		1	4.005	78.810	650
						0	4.006	78.810	525
SW2-2	428079.205	303229.303	80.350	0.775		1	1.006	79.575	675
						0	1.007	79.575	525

SuDS Carriers

Link	US Node	DS Node	Link Type	Base Inf Coef (m/hr)	Sides Inf Coef (m/hr)	Safety Factor	Time to Half Empty (mins)
1.006	SW2-1	SW2-2	Swale	0.00000	0.00000	2.0	1
4.005	SW1-1	SW1-2	Swale	0.00000	0.00000	2.0	1

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	35	0	0
100	40	0	0

Node 16_FC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	77.354	Product Number	CTL-SHE-0205-2410-1700-2410
Design Depth (m)	1.700	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	24.1	Min Node Diameter (mm)	1800

Node Pond Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	77.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	710.0	600.0	1.700	1273.4	1153.0	2.000	1389.8	1268.4

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	85.132	0.057	14.7	0.0649	0.0000	OK
15 minute summer	2	10	83.970	0.070	26.4	0.0795	0.0000	OK
15 minute summer	3	11	82.747	0.072	10.7	0.0810	0.0000	OK
15 minute summer	4	11	82.486	0.099	46.4	0.1116	0.0000	OK
15 minute summer	5	10	83.369	0.069	21.4	0.0782	0.0000	OK
15 minute summer	6	10	81.784	0.084	30.1	0.0947	0.0000	OK
15 minute summer	7	11	81.322	0.122	88.0	0.1381	0.0000	OK
15 minute summer	8	11	81.735	0.060	10.7	0.0676	0.0000	OK
15 minute summer	9	10	80.683	0.083	30.6	0.0939	0.0000	OK
15 minute summer	10	10	80.467	0.142	48.5	0.1601	0.0000	OK
15 minute summer	11	11	79.229	0.204	82.5	0.2307	0.0000	OK
15 minute summer	12	11	80.277	0.102	58.2	0.1148	0.0000	OK
15 minute summer	13	11	80.046	0.221	97.3	0.2499	0.0000	OK
15 minute summer	14	11	79.981	0.256	100.1	0.2893	0.0000	OK
15 minute summer	SW2-1	11	79.898	0.223	127.9	0.0000	0.0000	OK
360 minute summer	Pond	232	77.758	0.258	64.2	194.4913	0.0000	OK
360 minute summer	16_FC	232	77.750	0.396	22.6	1.0076	0.0000	SURCHARGED
360 minute summer	Outfall	232	77.400	0.120	22.5	0.0000	0.0000	OK
15 minute summer	SW1-1	11	79.138	0.188	82.6	0.0000	0.0000	OK
15 minute summer	SW1-2	12	78.958	0.148	81.3	0.0000	0.0000	OK
15 minute summer	SW2-2	11	79.743	0.168	124.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	14.5	1.860	0.136	0.2054	
15 minute summer	2	1.001	4	26.1	2.120	0.116	0.4304	
15 minute summer	3	2.000	4	10.4	0.823	0.122	0.4265	
15 minute summer	4	1.002	7	46.3	2.043	0.147	1.0185	
15 minute summer	5	3.000	6	21.1	1.495	0.118	0.8812	
15 minute summer	6	3.001	7	29.6	1.714	0.095	0.1970	
15 minute summer	7	1.003	13	88.4	1.616	0.166	2.8494	
15 minute summer	8	4.000	9	10.4	1.248	0.152	0.4040	
15 minute summer	9	4.001	10	30.4	0.987	0.075	0.5447	
15 minute summer	10	4.002	12	47.9	1.396	0.196	0.9088	
15 minute summer	11	4.004	SW1-1	82.6	1.425	0.551	0.7761	
15 minute summer	12	4.003	11	58.2	1.237	0.115	2.2732	
15 minute summer	13	1.004	14	97.5	1.024	0.289	1.9548	
15 minute summer	14	1.005	SW2-1	99.7	1.039	0.512	2.9338	
15 minute summer	SW2-1	1.006	SW2-2	124.9	0.590	0.073	6.0149	
360 minute summer	Pond	1.008_1	16_FC	22.6	0.254	0.138	4.6926	
360 minute summer	16_FC	1.008	Outfall	22.5	0.996	0.566	0.2838	327.5
15 minute summer	SW1-1	4.005	SW1-2	81.3	0.483	0.054	7.1170	
15 minute summer	SW1-2	4.006	Pond	82.9	3.045	0.136	0.3801	
15 minute summer	SW2-2	1.007	Pond	127.5	4.130	0.166	0.4305	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.91%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	85.221	0.146	73.3	0.1653	0.0000	OK
15 minute summer	2	10	84.075	0.175	132.0	0.1980	0.0000	OK
15 minute summer	3	10	82.854	0.179	53.4	0.2021	0.0000	OK
15 minute summer	4	11	82.655	0.268	233.3	0.3031	0.0000	OK
15 minute summer	5	10	83.465	0.165	106.7	0.1861	0.0000	OK
15 minute summer	6	11	81.960	0.260	150.5	0.2936	0.0000	OK
15 minute summer	7	11	81.894	0.694	430.6	0.7853	0.0000	SURCHARGED
15 minute summer	8	10	81.828	0.153	53.4	0.1732	0.0000	OK
15 minute summer	9	10	80.820	0.220	153.6	0.2490	0.0000	OK
15 minute summer	10	11	80.705	0.380	243.2	0.4303	0.0000	OK
15 minute summer	11	11	80.051	1.026	408.3	1.1608	0.0000	SURCHARGED
15 minute summer	12	11	80.489	0.314	290.5	0.3552	0.0000	OK
15 minute summer	13	11	80.798	0.973	472.9	1.1008	0.0000	SURCHARGED
15 minute summer	14	11	80.481	0.756	485.7	0.8548	0.0000	SURCHARGED
15 minute summer	SW2-1	11	80.111	0.436	626.1	0.0000	0.0000	OK
360 minute winter	Pond	352	78.535	1.035	150.6	912.4297	0.0000	SURCHARGED
360 minute winter	16_FC	352	78.534	1.180	25.6	3.0029	0.0000	SURCHARGED
60 minute winter	Outfall	36	77.405	0.125	24.1	0.0000	0.0000	OK
15 minute summer	SW1-1	11	79.327	0.377	409.5	0.0000	0.0000	OK
15 minute summer	SW1-2	11	79.135	0.325	407.5	0.0000	0.0000	OK
15 minute summer	SW2-2	10	79.965	0.390	627.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	72.8	2.787	0.681	0.6868	
15 minute summer	2	1.001	4	131.0	3.208	0.581	1.4787	
15 minute summer	3	2.000	4	52.5	1.247	0.614	1.4628	
15 minute summer	4	1.002	7	228.8	2.761	0.725	4.3747	
15 minute summer	5	3.000	6	105.9	2.215	0.593	3.2200	
15 minute summer	6	3.001	7	140.5	2.449	0.451	1.0923	
15 minute summer	7	1.003	13	428.3	2.703	0.803	8.0534	
15 minute summer	8	4.000	9	52.4	1.877	0.763	1.3550	
15 minute summer	9	4.001	10	153.2	1.370	0.376	1.9044	
15 minute summer	10	4.002	12	238.9	1.995	0.980	3.4315	
15 minute summer	11	4.004	SW1-1	409.5	3.713	2.733	1.4683	
15 minute summer	12	4.003	11	288.3	1.920	0.569	6.5126	
15 minute summer	13	1.004	14	472.7	2.188	1.400	4.4302	
15 minute summer	14	1.005	SW2-1	485.4	2.271	2.496	6.2338	
15 minute summer	SW2-1	1.006	SW2-2	627.4	0.904	0.367	20.0978	
360 minute winter	Pond	1.008_1	16_FC	25.6	0.255	0.156	11.5779	
360 minute winter	16_FC	1.008	Outfall	24.1	1.010	0.605	0.2988	680.8
15 minute summer	SW1-1	4.005	SW1-2	407.5	0.749	0.270	22.9767	
15 minute summer	SW1-2	4.006	Pond	412.3	3.801	0.674	1.7881	
15 minute summer	SW2-2	1.007	Pond	632.6	5.283	0.824	1.9086	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	85.513	0.438	96.4	0.4948	0.0000	SURCHARGED
15 minute summer	2	11	84.672	0.772	174.2	0.8735	0.0000	SURCHARGED
15 minute summer	3	11	84.009	1.334	70.1	1.5089	0.0000	FLOOD RISK
15 minute summer	4	11	83.873	1.486	289.5	1.6804	0.0000	FLOOD RISK
15 minute summer	5	11	83.980	0.680	140.3	0.7694	0.0000	SURCHARGED
15 minute summer	6	11	83.022	1.322	191.6	1.4952	0.0000	FLOOD RISK
15 minute summer	7	11	82.859	1.659	530.3	1.8766	0.0000	FLOOD RISK
15 minute summer	8	11	82.651	0.976	70.2	1.1042	0.0000	SURCHARGED
15 minute summer	9	11	81.794	1.194	191.5	1.3500	0.0000	SURCHARGED
15 minute summer	10	11	81.694	1.369	304.4	1.5486	0.0000	FLOOD RISK
15 minute summer	11	11	80.599	1.574	526.3	1.7804	0.0000	FLOOD RISK
15 minute summer	12	11	81.362	1.187	368.8	1.3429	0.0000	SURCHARGED
15 minute summer	13	11	81.199	1.374	584.1	1.5535	0.0000	SURCHARGED
15 minute summer	14	11	80.714	0.989	599.0	1.1189	0.0000	SURCHARGED
15 minute summer	SW2-1	11	80.156	0.481	782.7	0.0000	0.0000	OK
360 minute winter	Pond	352	78.895	1.395	200.3	1313.2860	0.0000	SURCHARGED
360 minute winter	16_FC	352	78.894	1.540	25.8	3.9192	0.0000	SURCHARGED
15 minute summer	Outfall	13	77.405	0.125	24.1	0.0000	0.0000	OK
15 minute summer	SW1-1	11	79.367	0.417	526.3	0.0000	0.0000	OK
15 minute summer	SW1-2	11	79.187	0.377	523.5	0.0000	0.0000	OK
15 minute summer	SW2-2	11	80.041	0.466	779.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	96.3	2.864	0.901	1.0461	
15 minute summer	2	1.001	4	162.4	3.115	0.721	2.4615	
15 minute summer	3	2.000	4	64.8	1.191	0.758	2.3671	
15 minute summer	4	1.002	7	276.5	2.808	0.877	4.9602	
15 minute summer	5	3.000	6	133.1	2.235	0.745	4.3855	
15 minute summer	6	3.001	7	177.9	2.417	0.571	1.2571	
15 minute summer	7	1.003	13	525.4	3.316	0.986	8.0534	
15 minute summer	8	4.000	9	67.7	1.983	0.987	1.9250	
15 minute summer	9	4.001	10	191.3	1.362	0.470	2.7536	
15 minute summer	10	4.002	12	304.0	2.021	1.247	4.1650	
15 minute summer	11	4.004	SW1-1	526.3	4.773	3.513	1.4686	
15 minute summer	12	4.003	11	368.7	2.327	0.728	7.4616	
15 minute summer	13	1.004	14	582.1	2.695	1.724	4.4302	
15 minute summer	14	1.005	SW2-1	597.7	2.768	3.074	6.4714	
15 minute summer	SW2-1	1.006	SW2-2	779.3	0.898	0.456	25.4634	
360 minute winter	Pond	1.008_1	16_FC	25.8	0.250	0.157	11.5779	
360 minute winter	16_FC	1.008	Outfall	24.1	1.010	0.604	0.2988	684.6
15 minute summer	SW1-1	4.005	SW1-2	523.5	0.781	0.347	28.1914	
15 minute summer	SW1-2	4.006	Pond	521.9	3.848	0.853	2.1815	
15 minute summer	SW2-2	1.007	Pond	787.1	5.281	1.025	2.3455	

DRAINAGE KEY

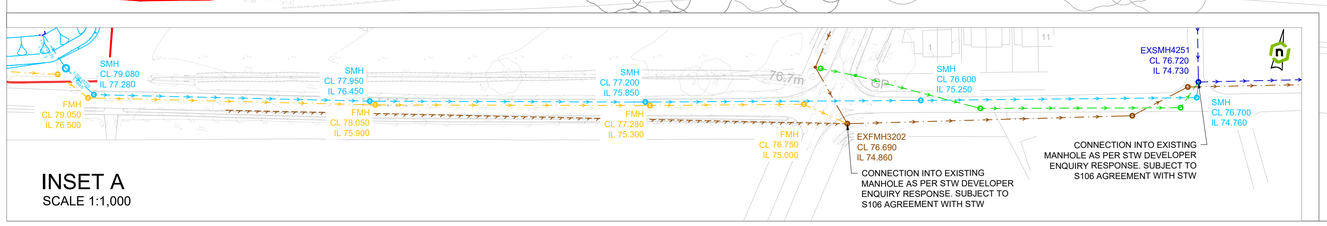
- EXISTING FOUL MANHOLE (FMH CL 46.000 IL 45.350)
- EXISTING FOUL SEWER
- EXISTING FOUL RISING MAIN
- EXISTING STORM MANHOLE (SMH CL 46.000 IL 45.350)
- EXISTING STORM SEWER
- EXISTING S104 STORM MANHOLE (SMH CL 46.000 IL 45.350)
- EXISTING S104 STORM SEWER
- PROPOSED FOUL MANHOLE (FMH CL 46.000 IL 45.350)
- PROPOSED FOUL SEWER. 150mm DIAMETER
- PROPOSED STORM MANHOLE
- PROPOSED STORM SEWER. DIAMETER AS SHOWN
- 3m MAINTENANCE BERM FOR POND. 1:40 SLOPE
- PROPOSED HEADWALL
- RESIDENTIAL LAND PARCEL
- PROPOSED SWALE
- PROPOSED RAINWATER HARVESTING TANK FOR LANDSCAPE IRRIGATION
- DIRECTION OF FLOOD EXCEEDANCE ROUTES

Warren Farm Cottages
Warren House
CHURCH ROAD
Pond
El Sub

SMH1 Ø1200 CL: 86.500m IL: 85.075m
FMH CL 86.400 IL 85.050
1.000 Ø225 1:23.9
SMH2 Ø1200 CL: 85.400m IL: 83.900m
FMH CL 85.350 IL 83.600
1.001 Ø225 1:24.5
SMH3 Ø1200 CL: 84.100m IL: 82.675m
2.000 Ø300 1:168.1
SMH4 Ø1200 CL: 84.100m IL: 82.387m
FMH CL 84.000 IL 81.540
1.002 Ø375 1:40.4
SMH5 Ø1200 CL: 84.800m IL: 83.300m
FMH CL 84.800 IL 83.450
3.000 Ø300 1:94.9
FMH CL 83.900 IL 82.550
FMH CL 83.350 IL 80.740
SMH6 Ø1200 CL: 83.300m IL: 81.700m
3.001 Ø300 1:41.4
SMH7 Ø1200 CL: 83.000m IL: 81.200m
FMH CL 82.950 IL 79.830
1.003 Ø450 1:37.0
PROPOSED 500L RAINWATER HARVESTING TANK FOR CENTRAL LANDSCAPING IRRIGATION
SMH8 Ø1200 CL: 83.100m IL: 81.675m
FMH CL 83.150 IL 81.750
4.000 Ø225 1:37.6
SMH9 Ø1200 CL: 82.100m IL: 80.600m
4.001 Ø450 1:63.2
FMH CL 82.000 IL 80.120
SMH10 Ø1200 CL: 81.950m IL: 80.325m
FMH CL 82.000 IL 79.400
4.002 Ø450 1:117.5
FMH CL 81.800 IL 78.300
SMH12 Ø1200 CL: 81.750m IL: 80.175m
4.003 Ø450 1:41.0
SMH11 Ø1200 CL: 80.650m IL: 79.025m
4.004 Ø375 1:17.5
FMH CL 80.700 IL 79.350
FMH CL 81.550 IL 78.000
1.004 Ø525 1:28.1
SMH13 Ø1200 CL: 81.500m IL: 79.825m
FMH CL 81.350 IL 77.710
SMH14 Ø1200 CL: 81.300m IL: 79.725m
1.005 Ø525 1:61.5
FMH CL 81.100 IL 77.300
SW2-1 CL 80.700 IL 79.675
SW2-1 CL 80.350 IL 79.575
SWALE 2
PROPOSED SWALE 1. SWALE BASE LEVEL TO BE 100mm LOWER THAN DOWNSTREAM IL TO PROVIDE TEMPORARY VOLUME REQUIRED FOR THE EVAPOTRANSPIRATION OF THE FIRST 5mm RAINFALL
PROPOSED SWALE 1. SWALE BASE LEVEL TO BE 100mm LOWER THAN DOWNSTREAM IL TO PROVIDE TEMPORARY VOLUME REQUIRED FOR THE EVAPOTRANSPIRATION OF THE FIRST 5mm RAINFALL
ATTENUATION POND
TOP OF BANK LEVEL 79.500
IL 77.500
BASE LEVEL 77.400
TOTAL AVAILABLE STORAGE VOLUME: 1,050m³
300mm FREEBOARD
1:3 SIDE SLOPES
SW1-1 CL 79.750 IL 78.950
SWALE 1
SW1-2 CL 79.550 IL 78.810
SMH16 CL 79.400 IL 77.354 VORTEX FLOW CONTROL DESIGN HEAD: 1.7m DESIGN FLOW: 24.1l/s
1.006 Ø150 1:40.3
SMHOutfall Ø1200 CL: 79.081m IL: 77.280m
1.006 Ø150 1:66.8
FMH CL 79.500 IL 76.650
FMH CL 79.050 IL 76.500
FMH CL 80.500 IL 77.100

FOR CONTINUATION SEE INSET A

INSET A
SCALE 1:1,000



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    - RAIN GARDENS
    - RAIN WATER HARVESTING/WATER BUTTS
    - FIN DRAINS
    - FILTER DRAINS/STRIPS
    - ATTENUATION PONDS
    - SWALES
    - PERMEABLE PAVING
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Rev.	Amendments	Date	By
P05	DETENTION BASIN SIZE REVISED	08.07.25	VI
P04	UPDATED TO ADDRESS THE NATIONAL STANDARDS FOR SuDS	01.07.25	VI
P03	REVISED MASTERPLAN	28.03.25	VI
P02	UPDATED FOR PLANNING	14.03.25	JAH
P01	UPDATED FOR PLANNING	04.03.25	JAH
P0	INITIAL ISSUE.	27.02.25	JAH

Revisions

Client: Richborough

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Project: LE25058 ORTON ROAD

Drawing: PROPOSED DRAINAGE STRATEGY

Scale @ A1	Drawn	Checked	Rev
1:500	JAH	VI	P05

Status: PLANNING (S5)

Originator: OR-LINK-GEN-XX-DR-C-0500

BEDDING NOTES

1. GRANULAR PIPE BEDDING MATERIAL FOR PIPES, AND BACKFILLING FOR TEMPORARY DRAINS (TRENCH SUB-DRAINS), SHALL CONSIST OF AGGREGATES FROM NATURAL SOURCES OR SINTERED PULVERIZED-FUEL ASH COMPLYING WITH THE RELEVANT PROVISIONS OF BS.882 AND BS.3797, PART 2 RESPECTIVELY, SIZED IN ACCORDANCE WITH THE FOLLOWING TABLE:

NOMINAL BORE	ALTERNATIVE AGGREGATE SIZES (mm)	
	SINGLE-SIZED	GRADED
100	10	-
150	10 OR 14	14 TO 5
225 - 300	10, 14 OR 20	14 TO 5 OR 20 TO 5
375 - 525	14 OR 20	14 TO 5 OR 20 TO 5
EXCEEDING	14, 20 OR 40	14 TO 5, 20 TO 5 OR 40 TO 5

2. SELECTED BACKFILL MATERIAL, WHETHER SELECTED FROM LOCALLY EXCAVATED MATERIAL OR IMPORTED, SHALL CONSIST OF UNIFORM, READILY COMPACTIBLE MATERIAL, FREE FROM VEGETABLE MATTER, BUILDING RUBBISH & FROZEN MATERIAL, OR MATERIALS SUSCEPTIBLE TO SPONTANEOUS COMBUSTION, & EXCLUDING CLAY OF LIQUID LIMIT GREATER THAN 80 AND/OR PLASTIC LIMIT GREATER THAN 55 AND MATERIALS OF EXCESSIVELY HIGH MOISTURE CONTENT, CLAY LUMPS AND STONES SHALL BE RETAINED ON 75mm AND 37.5mm SIEVES RESPECTIVELY.

3. COMPRESSIBLE FILLER FOR INTERRUPTING CONCRETE PROTECTION TO PIPELINES SHALL CONSIST OF BITUMEN IMPREGNATED INSULATING BOARD TO BS.1142, PART 3 OR OTHER EQUALLY COMPRESSIBLE MATERIAL. THE THICKNESS OF COMPRESSIBLE FILLER SHALL BE AS FOLLOWS:

NOMINAL BORE OF PIPE (mm)	THICKNESS OF COMPRESSIBLE FILLER (mm)
LESS THAN 450	18
450 - 1200	36
EXCEEDING 1200	54

4. THE CONTRACTOR IS TO PROTECT BURIED PIPES (PARTICULARLY SHALLOW PIPES) FROM DAMAGE CAUSED BY LOADS IMPOSED BY CONSTRUCTION PLANT.

5. BELOW ROADS AND OTHER PAVED AREAS TRENCHES SHALL BE BACKFILLED WITH DfT SPECIFICATION TYPE 1 SUB-BASE MATERIAL UP TO ROAD/PAVING FORMATION LEVEL. ALL OTHER TRENCHES,UNLESS OTHERWISE SPECIFIED SHALL BE BACKFILLED TO FINISHED GROUND LEVEL OR UNDERSIDE OF TOPSOIL LAYER WITH WELL COMPACTED EXCAVATED MATERIAL.

GRANULAR BEDDINGS

1. DIMENSION Y: 1/6 BC OR 100mm UNDER BARRELS, AND 50mm MIN. UNDER SOCKETS WHICHEVER IS THE GREATER (400 MAX.). ROCK ETC 1/4 BC AND 150mm MIN UNDER SOCKETS (400mm MAX.)

2. DN : NOMINAL BORE OF PIPE
3. BC : EXTERNAL DIAMETER OF PIPE BARREL

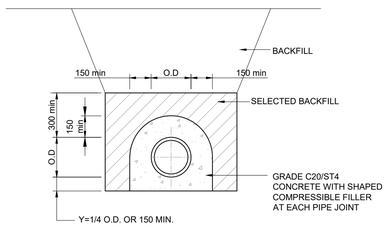
CONCRETE BEDDINGS

1. THE USE OF GRANULAR BEDDINGS BELOW CONCRETE BEDDINGS (BEDDING TYPES A2,A4,A6) ARE FOR USE IN WET CONDITIONS.
2. CONCRETE CRADLES MAY EXTEND TO SIDES OF TRENCH.
3. TRANSVERSE STEEL TO BE 0.4% MIN OF CONCRETE AT X-X (FM=3.4) UNLESS OTHERWISE STATED.
4. BEDDING BENEATH & AT SIDES OF PIPE TO BE WELL COMPACTED
5. BEDDING/BACKFILL DIRECTLY ABOVE PIPE TO BE LIGHTLY COMPACTED BY HAND. DIMENSION Y: 1/6BC OR 100mm UNDER BARRELS, AND 50mm UNDER SOCKETS WHICHEVER IS GREATER (SUBJECT TO 400mm MAX.).
6. DN = NOMINAL BORE OF PIPE.
7. BC = EXTERNAL DIAMETER OF PIPE BARREL.

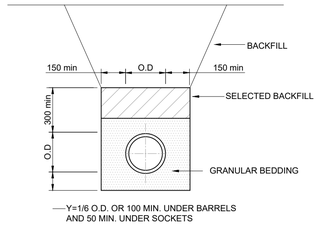
TRENCH WIDTH

1. THE MAXIMUM TRENCH WIDTHS ARE TO BE AS SHOWN BELOW UNLESS THE APPROVAL OF THE ENGINEER IS OBTAINED.

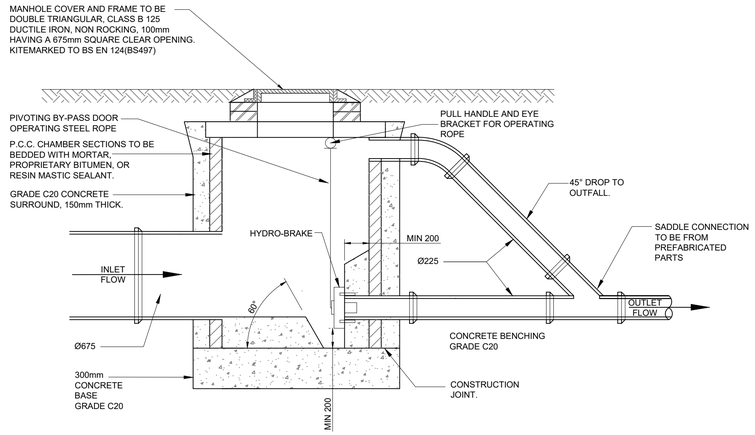
INTERNAL PIPE DIAMETER	MAXIMUM TRENCH WIDTH
100	600
150	600
225	700
300	850
375	1050
450	1150
525	1200
600	1350
675	1450
750	1500
825	1600
900	1900
975	2000
1050	2100
1200	2300



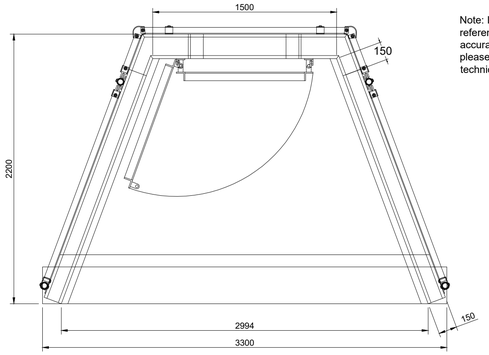
BED CLASS Z
PLAIN CONCRETE SURROUND
1:20



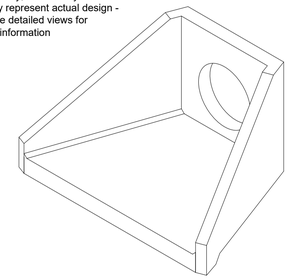
BED CLASS S
GRANULAR BED AND SURROUND
1:20

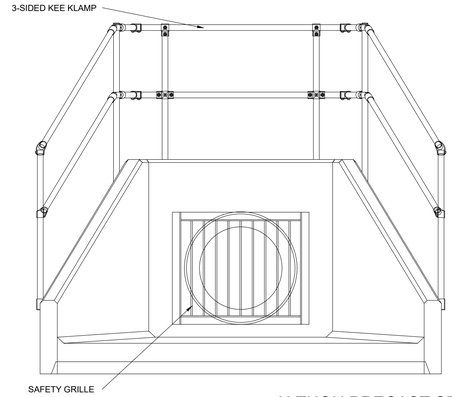


FLOW CONTROL CHAMBER
1:25



Note: Isometric drawing is for reference only, details may not accurately represent actual design - please see detailed views for technical information





ALTHON PRECAST SFA15B HEADWALL - Ø675 PIPE
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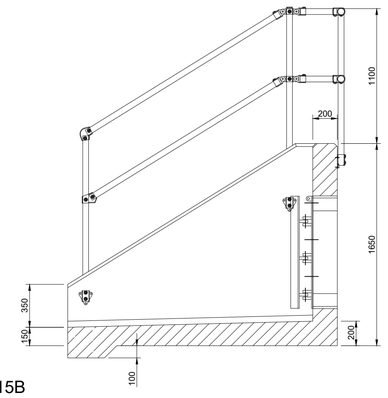

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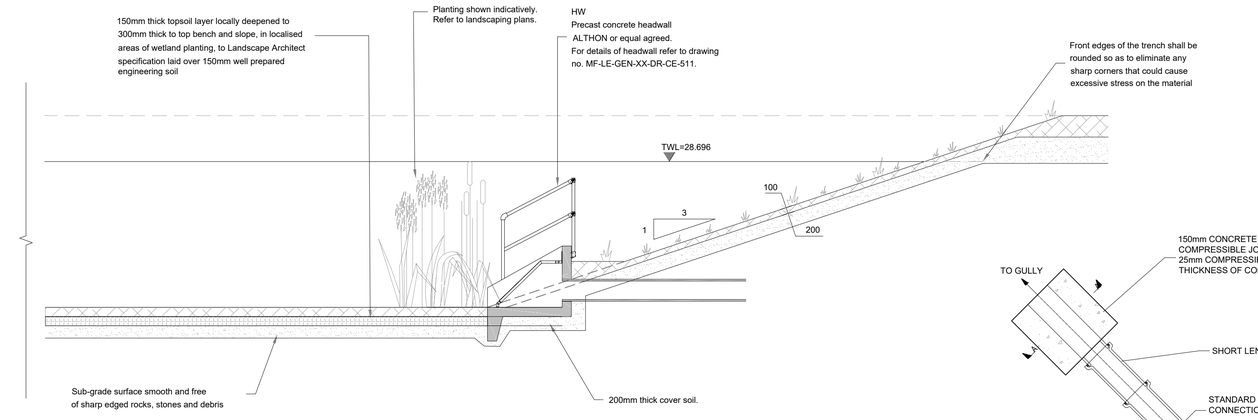
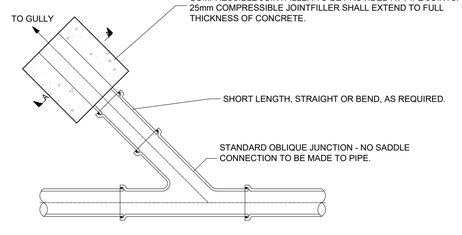
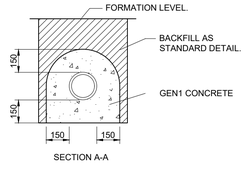


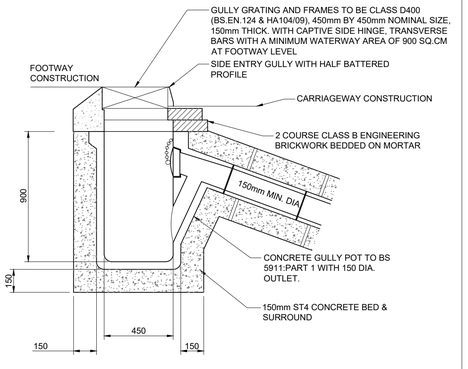
TYPICAL SECTION THROUGH UNLINED BIODETENTION BASIN
SCALE 1:50





SECTION A-A

GULLY CONNECTION
1:20



SIDE ENTRY TRAPPED ROAD GULLY DETAIL
1:20

Rev.	Amendments	Date	By
P01	DETENTION BASIN DETAILS UPDATED	16.07.25	JAH
P0	INITIAL ISSUE.	04.03.25	JAH

Revisions

Client: Richborough

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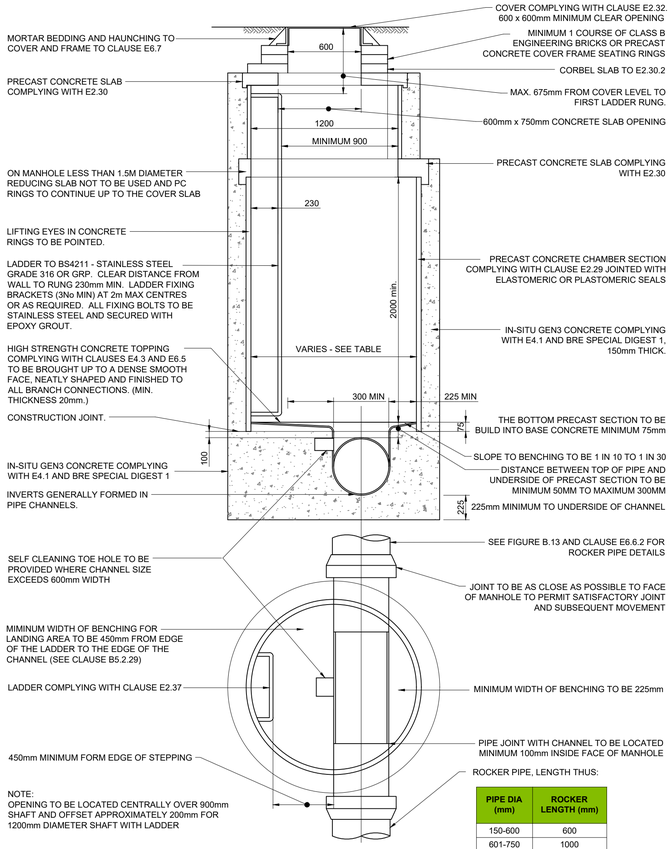
Project: LE25058 ORTON ROAD

Drawing: DRAINAGE DETAILS SHEET 1

Scale @ A1: AS SHOWN | Drawn: JAH | Checked: VBI | Rev: P01

Drawing No: OR-LINK-GEN-XX-DR-C-0550

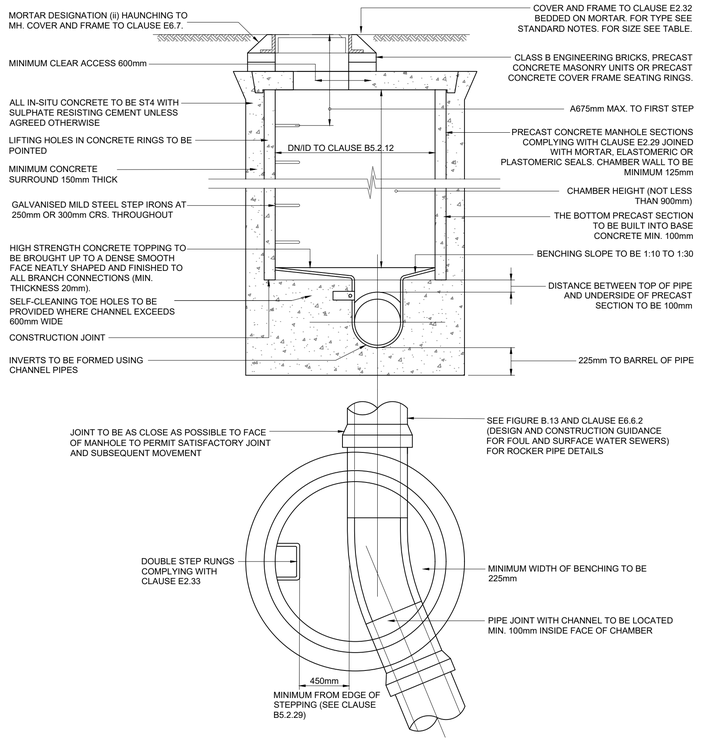
Status: PLANNING (S5)



PIPE DIA (mm)	ROCKER LENGTH (mm)
150-600	600
601-750	1000
>750	1250

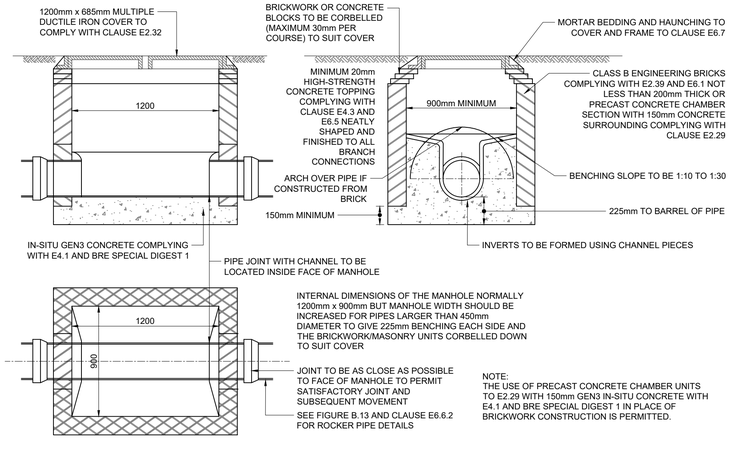
MANHOLE TYPE A

DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 3m TO 6m
1:25



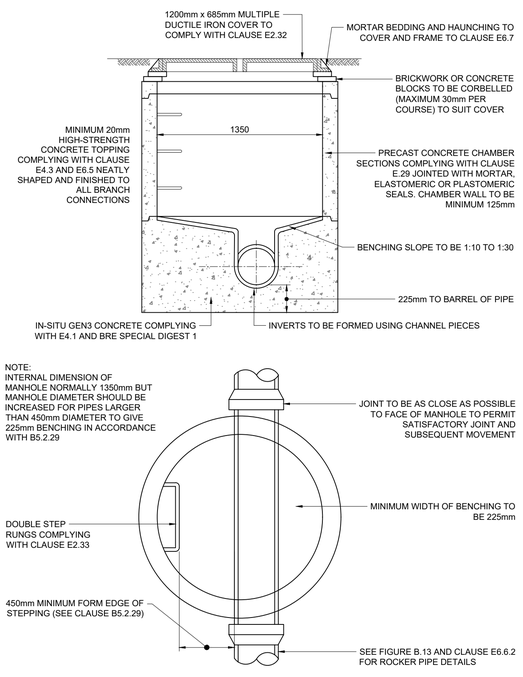
MANHOLE TYPE B

DEPTH FROM GROUND TO SOFFIT 3m
1:25



MANHOLE TYPE C

DEPTH FROM GROUND TO SOFFIT LESS THAN 1.5m
MAXIMUM PIPE SIZE 450MM DIAMETER
1:25



MANHOLE TYPE C

DEPTH FROM GROUND TO SOFFIT LESS THAN 1.5m
MAXIMUM PIPE SIZE 450MM DIAMETER
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Rev.	Amendments	Date	By
P0	INITIAL ISSUE.	04.03.25	JAH

Revisions

Client
Richborough

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Project
LE25058
ORTON ROAD

Drawing
DRAINAGE DETAILS
SHEET 2

Scale @ A1	Drawn	Checked	Rev
AS SHOWN	JAH	VBI	P0

DWG No
OR-LINK-GEN-XX-DR-C-0551

Status
PLANNING (S5)

APPENDIX E – Amenity and Biodiversity Assessment

BLADE

BIODIVERSITY RISK AND OPPORTUNITY ASSESSMENT

LAND NORTH OF ORTON ROAD, WARTON,

TAMWORTH, NR B79 0JG

ON BEHALF OF

MICHAEL ENSOR CATON & ANDREW NORMAN CATON C/O RICHBOROUGH

JULY 2025

V1

BIODIVERSITY
LANDSCAPE
ARBORICULTURE
DESIGN
ECOLOGY

Report Data	
Title	Biodiversity Risk and Opportunity Assessment
Site Address	Land off Orton Road, Warton, Tamworth, Nr B79 0JG
Client	Michael Ensor Caton & Andrew Norman Caton c/o Richborough
BLADE Reference	108-E-RP-PL-1988BROA

Version	Author	Date Issued
V1	E. Seaton BSc (Hons) MCIEEM	12 July 2025

CONTENTS

1.0 INTRODUCTION

Background to the Development

1.1 BLADE Ecology Ltd. was commissioned by Richborough to undertake a Biodiversity Opportunity and Risk Assessment that aligns with Standard 6: Biodiversity of the National Standards for Sustainable Drainage Systems (SuDS) for the land north of Orton Road, Warton (centred on Ordnance Survey grid reference SK 279 033).

1.2 The application site boundary is shown in Figure 1:

Figure 1: Application Site Boundary

1.3 Planning consent is being sought from North Warwickshire Borough Council for 'outline planning for the construction of up to 110 dwellings, with access, landscaping, sustainable drainage features, and associated infrastructure. All matters are reserved except for primary vehicular access from Church Road'

1.4 This report has been informed by the Landscape Strategy (drawing no. 1708-L-D-PL-200) and Proposed Drainage Strategy (LE25058 Rev: P05) produced by BLADE Landscape Architects and Link Engineering respectively.

2.0 BASELINE ECOLOGICAL CONDITIONS, CONSTAINTS AND SENSITIVITIES

Ecological Baseline

2.1 The site is 6.37ha in area and comprises arable land, a pond associated with willow scrub and developed land (Church Road). Species-rich hedgerows form the boundaries of the site.

Designated Sites

2.2 Eight statutory sites are present within 10km of the application site. These sites and their hydrological sensitivities are listed below:

- Birches Barns Meadow (SSSI) located c.940m south. Meadow SSSI sites often depend on traditional low-nutrient hydrology, including groundwater levels or seasonal wetness. Very sensitive to changes in surface runoff quality, nutrient load or altered infiltration.

- Alvecote Pools (SSSI) located c.1.9km north-west. Known for open water, fen, swamp, reedbed and marsh habitats. Highly hydrologically sensitive: changes in water quality, flow, or nutrient loading can directly affect species and habitat condition.

- Sheepy Fields (SSSI) located c.4.9km west. Grassland / meadow site – likely groundwater fed. Moderate sensitivity; runoff or infiltration changes unlikely to affect unless hydrologically linked.

- Kingsbury Wood (SSSI) located c.6.7km south-west. Ancient or semi-natural woodlands; less hydrologically sensitive unless located on floodplain or adjacent to a stream/wet area. Vulnerable to increased nutrients in runoff.

- Bentley Park Wood (SSSI) located c.6.9km south. Ancient or semi-natural woodlands; less hydrologically sensitive unless located on floodplain or adjacent to a stream/wet area. Vulnerable to increased nutrients in runoff.

- River Mease (SAC) located c.7.6km north. Internationally designated river system, sensitive to nutrient loading, sedimentation and flow variation. Surface water runoff anywhere in the Mease catchment is considered high risk. NOTE: the application site does not fall within this catchment.

- Hoar Park Wood (SSSI) located c. 10km south. Ancient or semi-natural woodlands; less hydrologically sensitive unless located on floodplain or adjacent to a stream/wet area. Vulnerable to increased nutrients in runoff.

- Middleton Pool (SSSI) located c.10km south-west. Designated for standing water and associated wetland birds. Some sensitivity to hydrology, but distance reduces direct impact risk.

Protected Species

2.3 No protected species sensitive to hydrological changes have been identified. An eDNA survey to confirm the presence / absence of great crested newts was undertaken of the on-site pond was on 16 April 2025. This confirmed newts to be absent (see BLADE Ecology, 2025). No newts were confirmed within any ponds within 250m.

Priority Habitats

2.4 The main ecological value of the site is the species-rich hedgerows along the boundaries of the site. These are listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 as a Priority Habitat in England. A pond is also present at the east of the site. It is overshaded by goat willow *Salix caprea* scrub with minimal aquatic vegetation present. Common nettle *Urtica dioica* dominates the banks.

3.0 NATIONAL STANDARD FOR SUSTAINABLE DRAINAGE SYSTEMS (SUDS)

Standard 6: Biodiversity – Key Principles & Best Practice Guidance

3.1 Standard 6: Biodiversity from the National Standards for Sustainable Drainage Systems (SuDS) published in June 2025 is embedded within a broader shift towards nature-based, multifunctional drainage design with the following aims:

3.2 Adopt the overarching SuDS Approach. A holistic SuDS approach must be applied to ensure that the surface water drainage system maximises biodiversity benefits throughout the entire lifecycle—design, construction, operation, and maintenance.

3.3 Design for ecological value. SuDS designs should actively:

- Create diverse, self-sustaining, resilient ecosystems, contributing to measurable biodiversity net gain
- Support local species and habitats through alignment with Local Nature Recovery Strategies (LNRS) and biodiversity action plans
- Enhance habitat connectivity across the development and wider catchment

3.4 Integrate biodiversity from the outset. At the conceptual design stage, prepare a biodiversity risk and opportunity assessment. This should include:

- Existing ecological baseline (flora, fauna, designated sites)
- Site sensitivity and risk factors (water quality, hydrology)
- Opportunities in local biodiversity frameworks and regulatory strategies
- Alignment with biodiversity net-gain (BNG) and nutrient neutrality metric

3.5 Follow the mitigation hierarchy. The assessment must establish how impacts on biodiversity will be avoided, mitigated, or compensated. Evidence should demonstrate that changes in runoff volumes, rates, discharge points will not harm ecological quality or hydrological regimes consistent with Water Framework Directive objectives.

3.6 Demonstrate aligned outcomes. The final SuDS design should:

- Show how it supports local biodiversity strategies or designated conservation sites
- Include measures to manage invasive species and maintain ecological resilience
- Provide a clear case for educational value (e.g. biodiversity information boards within design)

- Align biodiversity delivery with other SuDS standards: water quality, amenity, hydrology and climate resilience

3.7 By embedding Standard 6 from the earliest stages of design and ensuring multidisciplinary alignment—across water management, ecology, and amenity—developers can deliver SuDS that not only manage flood risk and water quality, but also significantly enhance biodiversity outcomes.

4.0 SUDS DESIGN OVERVIEW

Description of SuDS Features Proposed

4.1 The following components form part of the water drainage strategy for the site:

- Rainwater Harvesting System. A harvesting system has been proposed for the irrigation of the central landscaped area.

- Infiltration Systems. Infiltration techniques are to be employed, based on an infiltration rate of less than $1x10^{-6}$ m/s for the management of the everyday rainfall (5 mm).

- Swales. Swales are included to provide effective source control, reduce runoff rates, improve water quality through natural filtration, and enhance amenity and biodiversity in line with SuDS principles.

- Porous Pavements. Areas of the proposed development to be finished with porous pavements.

- Detention Basin. A detention basin has been provided in the southeast corner of the site to treat and attenuate all surface water flows picked up by the drainage network.

4.2 Subject to the mitigation measures proposed. The development will not significantly increase flood risk to the wider catchment (see Flood Risk Assessment ref LE25058 dated March 2025).

Multi-functional Benefits for Biodiversity

4.3 Rainwater harvesting systems collect and store rainfall from rooftops and impermeable surfaces for later use, reducing the volume and rate of runoff entering the local drainage network. Although they are primarily engineered for water conservation and flood reduction, they indirectly support biodiversity by decreasing pressure on natural watercourses and reducing pollutant loads.

4.4 Infiltration systems help maintain soil moisture levels, beneficial for surrounding vegetation, particularly native and moisture-dependent plant species. By filtering pollutants as water percolates through the soil, infiltration systems support healthier soil microbial communities and provide habitat conditions suitable for a diverse range of flora and fauna, contributing to local biodiversity.

4.5 The swales are to support planted banks and bases will be seeded with native grasses, and wildflowers (Emorsgate EM8 Wetland meadow and Emorsgate EP1 Pond Edge) providing foraging and nesting habitat for pollinators, small mammals, and birds. Swales enhance landscape connectivity, linking habitats and facilitate wildlife movement. Their variable moisture zones support a range of plant species, increasing structural diversity and biodiversity value.

4.6 Porous pavements help reduce the urban heat island effect and creates microhabitats for mosses, lichens, invertebrates, and microorganisms. By supporting a more natural water cycle in built environments, porous pavements help create conditions that are more hospitable to urban biodiversity.

4.7 The detention basin has been designed with ecological principles in mind, including varied planting, gradients and a wet core. It will support aquatic and marginal plants (EM8 wetland meadow, EP1 pond edge and marginal wetland planting mixes), attracting amphibians, dragonflies, and birds, and offer breeding and feeding grounds for a wide range of species. Its fluctuating water levels will create dynamic wetland-like environments, enhancing habitat diversity

5.0 BIODIVERSITY RISKS, CONSTRAINTS & MITIGATION

Impact on Designated Sites

5.1 A review of designated sites within a 10 km radius of the application site has identified several locations of ecological and hydrological sensitivity, including Birches Barns Meadow SSSI, Alvecote Pools SSSI, and the River Mease SAC. These sites support habitats such as species-rich meadows, fen, swamp, and open water bodies, many of which rely on low-nutrient, hydrologically stable conditions and are therefore potentially vulnerable to alterations in water quality, flow, or infiltration dynamics.

5.2 However, the accompanying Flood Risk Assessment (FRA) confirms that the proposed development, incorporating a robust Sustainable Drainage System (SuDS) strategy, will not result in significant hydrological changes to the wider catchment. The surface water drainage design includes rainwater harvesting systems, infiltration features, swales, porous paving, and a detention basin, all of which are intended to manage runoff at source, mimic natural drainage, and control discharge rates. These measures will help to maintain existing flow regimes and minimise the risk of increased nutrient or sediment loading into nearby watercourses or groundwater.

5.3 On this basis, no significant impact is anticipated and the proposed surface water strategy sufficient to protect the hydrological and ecological function of nearby designated sites.

Invasive Species or Poor Management Risks

5.4 SuDS features can unintentionally provide suitable habitats or dispersal routes for invasive non-native species (INNS), which can threaten native biodiversity, hinder SuDS functionality, and increase long-term maintenance costs.

5.5 The key objectives of this management approach are to prevent the introduction and spread of INNS within all SuDS elements, ensure regular and effective monitoring to allow early detection of any incursions, and respond promptly with appropriate eradication or control measures. These actions will be undertaken in accordance with legal obligations under the Wildlife and Countryside Act 1981 (as amended).

5.6 A range of potential pathways for the introduction of invasive species has been identified. These include the movement of contaminated soil, plant material or machinery during the construction phase; waterborne transport via surface runoff from surrounding roads, domestic gardens and natural colonisation from adjacent habitats where invasive species are already present. Additionally, the use of non-native ornamental plants within SuDS landscaping schemes can create further risk of accidental introduction.

5.7 To mitigate these risks, robust prevention measures will be implemented. All contractors and maintenance operatives will adhere to strict biosecurity protocols, including the cleaning of footwear, tools, and machinery prior to entering and leaving the site. Materials such as soil, mulch and plants will be sourced only from certified

suppliers and inspected for signs of contamination. The planting design for SuDS features has been designed to use native and locally appropriate species, explicitly excluding any non-native species or plant listed under Schedule 9 of the Wildlife and Countryside Act.

5.8 No invasive species are currently present within the application site. Once the SuDS features are operational, monitoring will be undertaken quarterly for the first two years and annually thereafter. These inspections will involve thorough checks for any invasive species. Regular reporting will ensure that any new occurrences are promptly addressed and that data can inform adaptive management approaches.

5.9 Where INNS are detected; qualified ecologist will be engaged to develop a species-specific control strategy in line with current best practice guidance. Depending on the species and extent of spread, control measures may include manual removal, targeted removal by licensed operatives or modifications to the habitat to make it less favourable for colonisation. During any eradication works, care will be taken to prevent further spread through the careful containment and disposal of removed material to a suitably licensed waste facility.

Post-construction Biodiversity Safeguards

5.10 To safeguard the ecological integrity of the proposed SuDS features and associated wildflower grassland, the area will be securely fenced to minimise disturbance from nearby development. This zone includes species-rich grassland sown with Emorsgate EM8 Wetland Meadow and Emorsgate EP1 Pond Edge mixtures, which are specifically selected to enhance habitat diversity and support a range of invertebrates, pollinators, and wetland species.

5.11 Given the proximity to residential development, fencing is proposed as a proactive measure to limit recreational pressure, restrict trampling, and prevent informal access that could degrade habitat quality. This approach ensures that sensitive vegetation communities are given the opportunity to establish and thrive, contributing positively to site-level biodiversity and wider green infrastructure connectivity.

Mitigation Hierarchy

5.12 The proposals have been designed in accordance with the mitigation hierarchy.

Avoid

5.13 The development has been shaped to avoid hydrological impacts on sensitive ecological receptors. The development avoids creating new outfalls to nearby watercourses or designated wetlands. Instead, surface water will be managed on-site through a decentralised SuDS network, eliminating the need for off-site discharge that could pose a risk to sensitive habitats.

Minimise

5.14 Where indirect risks exist, such as potential changes to runoff volumes or water quality, these have been minimised through an integrated Sustainable Drainage System (SuDS). The strategy includes:

- Rainwater harvesting systems to reduce the overall volume of surface runoff;
- Infiltration features and porous paving to slow and disperse surface water;
- Swales and a detention basin to provide flow attenuation, pollutant filtration, and sediment capture.

Restore & Compensation

5.15 As a result of the avoidance and minimisation measures described, and due to the integrated biodiversity targeted SuDS strategy, there are no residual adverse impacts requiring restoration or compensation.

6.0 BIODIVERSITY OPPORTUNITY

Biodiversity Net Gain Integration

6.1 The detention basin has designed to support a permanent wet core. This has been achieved via ensuring that the base of the basin is 450-600m lower than the downstream irrigation level. This creates a 'medium distinctiveness' pond habitat delivering 0.5 habitat units.

6.2 The basin and swales are to be planted with a range of species-rich grassland and aquatic planting (EM8 Wetland Meadow, EP1 Pond Edge and marginal wetland planting mixes). This in combination with the wider fenced-off species-rich (other neutral) grassland will deliver 6.23 habitat units.

6.3 Overall, the scheme will deliver a +15.60% habitat gain and +13.30% hedgerow gain.

Planting Mixes: Biodiversity & Hydrological Benefits

6.4 The EM8 Wetland Meadow Mix contains a wide variety of native grasses and flowering plants, such as meadowsweet *Filipendula ulmaria*, ragged robin *Silene flos-cuculi*, and marsh marigold *Caltha palustris*, supporting a structurally and botanically diverse sward. This plant diversity supports a wide range of invertebrates, including specialist pollinators and butterflies.

6.5 The flowering species in the mix offer extended nectar and pollen availability throughout the growing season, benefitting bees, hoverflies, moths, and beetles. Taller grasses and wildflowers also create overwintering and breeding niches.

6.6 The EM8 mix is also adapted to seasonally waterlogged or wet soils, so will thrive in the proposed SuDS features. The plants help to stabilise soil, improve water filtration, and reduce nutrient runoff, indirectly improving water quality and downstream habitats.

6.7 The EP1 Pond Edge Mix is specifically designed for shallow pond margins, wet ditches, and ephemeral wetland edges, offering high biodiversity value through its carefully selected native species suited to wet, seasonally inundated soils.

6.8 The mix comprises a range of species such as purple loosestrife *Lythrum salicaria*, meadowsweet *Filipendula ulmaria*, and marsh woundwort *Stachys palustris* due to their high value to bees, butterflies, and hoverflies. This mix extends the flowering period, supporting pollinators from early summer into late autumn.

6.9 The pond edge zone planted with EP1 provides diverse leaf types, heights, and moisture levels, encouraging a wide array of aquatic and semi-aquatic invertebrates including damselflies, water beetles, snails, and spiders.

6.10 Plants in the EP1 mix help filter sediments and nutrients from surface water runoff before it enters ponds or ditches, improving water quality and reducing eutrophication risks.

7.0 COMPLIANCE WITH STANDARDS 5 & 6 AND POLICY ALIGNMENT

Policy Alignment

7.1 The proposed drainage and biodiversity focused landscape strategy aligns closely with local, regional, and national policy objectives, including the North Warwickshire Borough Council Local Plan (2021), the Warwickshire Local Nature Recovery Strategy (LNRS) and the Humber River Basin Management Plan (RBMP).

North Warwickshire Borough Council Local Plan (Adopted 2021)

7.2 The Local Plan includes several policies relevant to this development, particularly:

- Policy LP15 (Nature Conservation), which seeks to protect and enhance biodiversity, ensure no net loss of habitats, and deliver measurable Biodiversity Net Gain (BNG).
- Policy LP17 (Green Infrastructure), which encourages the use of green infrastructure, including SuDS, to deliver multifunctional benefits such as water quality improvement, ecological connectivity, and recreational value.
- Policy LP14 (Landscape), which supports the use of landscape design to protect character and support wildlife.

7.3 The development's use of native wetland and pond-edge seed mixes (EM8 and EP1), alongside an integrated SuDS system, directly contributes to these policy aims by creating species-rich grassland habitats and hydrologically functional green infrastructure.

Local Nature Recovery Strategy (Warwickshire, Coventry & Solihull LNRS)

7.4 The proposals align with emerging priorities within the Local Nature Recovery Strategy, including:

- The creation of wetland and grassland habitats.
- Enhancing functional connectivity between ecological networks by creating wildlife-friendly SuDS features and green corridors (grassland)
- Recreational pressure management, as achieved by fencing off biodiversity-rich areas near development.

Humber River Basin Management Plan (RBMP)

7.5 The development falls under the Humber River, and the proposals align with the RBMP objectives, particularly:

- Improving water quality by managing urban runoff.
- Using green infrastructure to reduce diffuse pollution.

- Mimicking natural hydrological processes through SuDS.

7.6 The proposed SuDS scheme achieves these goals by integrating infiltration, rainwater harvesting, and vegetated treatment systems that filter, slow, and retain water before discharge.

Standard 5: Amenity Compliance

7.7 Standard 5 requires SuDS to be designed in a way that delivers wider amenity benefits for local communities, including opportunities for visual enhancement, connection to nature, and well-designed open space. Although parts of the SuDS and wildflower grassland area are to be fenced off to protect sensitive habitats from recreational pressure, the overall drainage and landscape strategy contributes to amenity in several key ways:

- The use of diverse wildflower seed mixes—Emorsgate EM8 Wetland Meadow and EP1 Pond Edge within swales and the detention basin ensures that SuDS features contribute aesthetically to the landscape.

- The SuDS network helps structure the layout of the site with naturalistic landscape features around the boundaries, increase green cover, and support wellbeing through proximity to biodiverse, semi-natural habitats. Fencing sensitive areas also enables clear zoning, ensuring that dedicated amenity spaces can be used appropriately without compromising ecological value.

Standard 6: Biodiversity Compliance

7.8 The proposed SuDS and biodiversity strategy aligns with Standard 6 of the National Standards for Sustainable Drainage Systems (SuDS), which requires SuDS to be designed to support and enhance biodiversity.

7.9 Through the integration of multifunctional SuDS features—such as swales, infiltration systems, and a detention basin—planted with species-rich mixes (Emorsgate EM8 Wetland Meadow and EP1 Pond Edge), the development delivers high-quality habitat creation and supports ecological connectivity. Hydrological impacts to nearby designated sites are avoided or minimised through a well-designed surface water strategy that mimics natural drainage, protects water quality, and prevents nutrient enrichment.

8.0 REFERENCES

BLADE Ecology (2025). *Great Crested Newt eDNA Report – Orton Road, Warton*. BLADE Ecology Ltd., Worcester, UK.

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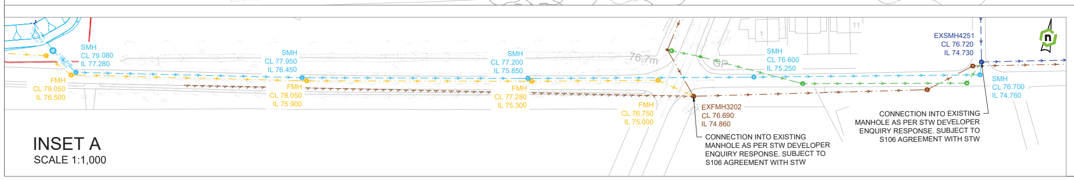
Environment Agency, 2022. *Humber River Basin Management Plan: Part 1 – River basin district overview*. Environment Agency. Available at: https://www.gov.uk/government/publications/river-basin-management-plan-humber-river-basin-district [Accessed 12 Jul. 2025].

North Warwickshire Borough Council, 2021. *North Warwickshire Local Plan 2021*. North Warwickshire Borough Council. Available at: https://www.northwarks.gov.uk/downloads/file/9453/north_warwickshire_local_plan_2021 [Accessed 12 Jul. 2025].

Warwickshire County Council, 2023. *Local Nature Recovery Strategy – Draft for Warwickshire, Coventry and Solihull*. Warwickshire County Council. Available at: https://www.warwickshire.gov.uk/lnrs [Accessed July 2025].

DRAINAGE KEY

Symbol	Description
FMH CL 46.000 IL 45.350	EXISTING FOUL MANHOLE
	EXISTING FOUL SEWER
	EXISTING FOUL RISING MAIN
SMH CL 46.000 IL 45.350	EXISTING STORM MANHOLE
	EXISTING STORM SEWER
SMH CL 46.000 IL 45.350	EXISTING S104 STORM MANHOLE
	EXISTING S104 STORM SEWER
FMH CL 46.000 IL 45.350	PROPOSED FOUL MANHOLE
	PROPOSED FOUL SEWER. 150mm DIAMETER
	PROPOSED STORM MANHOLE PROPOSED STORM SEWER. DIAMETER AS SHOWN
	3m MAINTENANCE BERM FOR POND. 1:40 SLOPE
	PROPOSED HEADWALL
	RESIDENTIAL LAND PARCEL
	PROPOSED SWALE
	PROPOSED RAINWATER HARVESTING TANK FOR LANDSCAPE IRRIGATION
	DIRECTION OF FLOOD EXCEEDANCE ROUTES



INSET A
SCALE 1:1,000

GENERAL NOTES

1. THIS DRAWING SHOULD NOT BE PRODUCED IN WHOLE OR PART WITHOUT THE WRITTEN CONSENT OF LINK ENGINEERING.
2. DO NOT SCALE FROM THIS DRAWING. UNITS ARE IN METRES UNLESS NOTED OTHERWISE.
3. THE CONTRACTOR IS TO CHECK ALL INFORMATION PROVIDED PRIOR TO COMMENCING WORKS AND SEEK CLARIFICATION FROM THE ENGINEER IN RESPECT TO ANY AMBIGUITIES FOUND.
4. ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
5. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER SCHEME SPECIFIC DRAWINGS & SPECIFICATIONS.
6. BACKGROUND PLAN BASED ON TOPOGRAPHIC SURVEY DATA CREATED BY OTHERS AND SUPPLIED FOR THE PURPOSE OF CARRYING OUR ENGINEERING WORKS. WE CANNOT BE HELD RESPONSIBLE FOR THE CONTENT, COMPLETENESS AND ACCURACY PROVIDED TO US BY OTHERS. THE CONTRACTOR SHALL CHECK ALL DIMENSIONS AND LEVELS ON SITE.
7. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH BUILDING REGULATION'S PART H AND / OR THE LATEST SEWERAGE SECTOR GUIDANCE APPENDIX C DESIGN AND CONSTRUCTION GUIDANCE.
8. ALL PROPOSED CONNECTIONS TO EXISTING PUBLIC SEWERS WILL BE SUBJECT TO A S106 APPLICATION. THE APPLICATION IS REQUIRED TO BE SUBMITTED BY THE APPOINTED CONTRACTOR.
9. THE RUNOFF RATES HAVE BEEN CALCULATED IN ACCORDANCE WITH ENVIRONMENT AGENCY'S (EA) RAINFALL RUNOFF MANAGEMENT FOR DEVELOPMENTS REPORT - SC030219.
10. THE CLIMATE CHANGE ALLOWANCES FOR THE 3.3% AND 1% AEP ARE IN ACCORDANCE WITH EA'S GUIDANCE "FLOOD RISK ASSESSMENTS: CLIMATE CHANGE ALLOWANCES".
11. THE ATTENUATION STORAGE HAS BEEN DESIGNED TO ACCOMMODATE UP TO AND INCLUDING THE 1 IN 100 YEAR RETURN PERIOD INCLUDING CLIMATE CHANGE ALLOWANCE AS PER THE EA GUIDANCE.
12. ALL INVERT & COVER LEVELS ARE SUBJECT TO FURTHER DETAIL DESIGN AS THE SITE LAYOUT DEVELOPS.
13. THIS INFORMATION IS PROVIDED TO SUPPORT AN OUTLINE PLANNING APPLICATION.
14. FURTHER DETAILED DESIGN AND CONSIDERATION OF THE DRAINAGE IS TO BE PROVIDED AS PART OF FURTHER RESERVED MATTERS APPLICATIONS BASED ON DEVELOPED PARCEL LAYOUTS. THE INFORMATION ON THIS DRAWING SHOWS THE KEY PRINCPALS OF THE DRAINAGE PROPOSALS DEMOSTRATING THAT A SUITABLE SCHEME CAN BE PROVIDED WITHIN THE DEVELOPMENT SITE.
15. A SITE SPECIFIC FLOOD RISK ASSESSMENT HAS BEEN PROVIDED TO SUPPORT THE PLANNING APPLICATION. THE USE OF SOURCE CONTROL SUDS IS ENCOURGED WITHIN THIS DOCUMENT AND IT IS EXPECTED THAT MORE DETAIL OF THESE SUDS MEASURES WILL BE PROVIDED AT A LATER DATE. THESE SUDS MEASURES ARE LIKELY TO INCLUDE THE FOLLOWING, NOTE OTHER SYSTEMS COULD BE CONSIDERED ALSO;
   - RAIN GARDENS
   - RAIN WATER HARVESTING/WATER BUTTS
   - FIN DRAINS
   - FILTER DRAINS/STRIPS
   - ATTENUATION PONDS
   - SWALES
   - PERMEABLE PAVING
17. ALL EXISTING DRAINAGE OUTFALLS ARE TO BE PROVED BY APPROPRIATE SURVEY AND CCTV SYSTEM AS REQUIRED TO ESTABLISH CONNECTION AND CONDITION. ANY REQUIRED REMEDIAL WORKS WITHIN THE SITE AREA SHALL BE UNDERTAKEN AS PART OF THE WORKS.
18. APPROPRIATE DISCHARGE CONSENTS ARE TO BE PROVIDED FOR ALL CONNECTIONS TO THE EXISTING DRAINAGE SYSTEMS.
19. CONSIDERATION WITHIN THE DESIGN IS TO BE GIVEN TO ACCESS FOR MAINTENANCE OF SUDS FEATURES INCLUDING LAY-BYS AND ACCESS TRACK TO PONDS AND CONTROL DEVICES.

Rev.	Amendments	Date	By
P05	DETENTION BASIN SIZE REVISED	08.07.25	VI
P04	UPDATED TO ADDRESS THE NATIONAL STANDARDS FOR SuDS	01.07.25	VI
P03	REVISED MASTERPLAN	28.03.25	VI
P02	UPDATED FOR PLANNING	14.03.25	JAH
P01	UPDATED FOR PLANNING	04.03.25	JAH
P0	INITIAL ISSUE.	27.02.25	JAH

Revisions

Client
Richborough

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Project
LE25058
ORTON ROAD

Drawing
PROPOSED DRAINAGE STRATEGY

Scale @ A1	Drawn	Checked	Rev
1:500	JAH	VI	P05

DWG No
OR-LINK-GEN-XX-DR-C-0500

Status
PLANNING (S5)

LEGEND

N

0 10 20 35m

REV	Description	Date
V4	Drainage proposals updated	10/07/25
V3	Layout updated	27/03/25
V2	Fencing extent reviewed	12/03/25
V1	First Issue	05/03/25

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CLIENT
Richborough, Michael Ensor Caton & Andrew Norman Caton

PROJECT
Land north of Orton Road, Warton

DRAWING TITLE
Landscape Strategy

DRAWING STATUS
Planning

DRAWING NO.				REVISION
1708-L-D-PL-200				V4
DRAWN	CHECKED	SCALE	PAPER SIZE	DATE
ST	–	1:500	A0	FEB 2025

APPENDIX B

Qualifications and Experience

BLADE Ecology Ltd is Registered Practice of the Chartered Institute of Ecology and Environmental Management (CIEEM). A comprehensive range of ecological services are offered including Preliminary Ecological Appraisal (PEA), Ecological Impact Assessment (EcIA), Habitat Regulations Assessment (HRA), Biodiversity Impact Assessment (BIA) and European Protected Species (EPS) Surveys / Licensing.

The practice works closely work closely with clients to achieve their aspirations alongside securing the best outcomes for the environment. With wildlife legislation and policy as its basis; commercial awareness, pragmatism and defensible advice is combined to form BLADE Ecology's approach.

As well as offering a wide range of ecological services, BLADE Ecology offers an in-house collaborative approach in conjunction with BLADE Landscape Architects and BLADE Trees.

Emma Seaton BSc (Hons) MCIEEM

Emma holds a BSc (Hons) degree in Biology from the University of Sheffield and has since gained a postgraduate certificate in Ecological Consultancy. Her ecological experience includes Preliminary Ecological Appraisals, Ecological Impact Assessments (EcIA), surveying for notable / European Protected Species, mitigation / licensing advice and providing Continued Professional Development (CPD) sessions for developers on Biodiversity Net Gain. She has held Natural England survey licences for bats (Class 2), great crested newts and white-clawed crayfish since 2015. She is also a Registered Consultant under the Bat Mitigation Class Licence (BMCL) licence and Earned Recognition consultant under the Natural England bat pilot project. Emma is a Full member of the Chartered Institute of Ecology and Environmental Management.

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