

Land at Gate Farm, High
Street, Sutton Benger

Flood Risk Assessment &
Drainage Strategy

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Flood Risk Assessment & Drainage Strategy

For

Gleeson Land

14 Nov 2025

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Executive Summary

Client	Gleeson Land
Planning Authority	Wiltshire Council
Lead Local Flood Authority (LLFA)	Wiltshire Council
Local Sewerage Undertaker	Wessex Water
Location	OS GR: E: 393999; N: 178513. Land at Gate Farm, High Street, Sutton Benger Postcode: SN15 4NW
Site area	4.97 ha
Current land use	Greenfield
Development Proposals	Outline planning application (with all matters reserved except means of access, from the B4069) for up to 90 no. (class C3) residential dwellings (including 40% affordable dwellings) including the creation of new vehicular access (from the B4069), pedestrian and cycle paths, parking spaces, public open space, biodiversity enhancement, landscape planting, surface water attenuation, associated infrastructure and other associated works.
Flood Zone (Tidal/Fluvial)	Flood Zone 1
Pluvial Flood Risk	Low – EA mapping shows no significant surface water flow routes affecting the site.
Groundwater Flood Risk	Predominantly Negligible, with localised Low-Moderate-High areas confined to the northern and eastern edges.
Infrastructure Flood Risk	Low – Site is outside all reservoir flood extents.
Existing Surface Water Drainage Regime	Infiltration occurring across the site.
Existing Foul Water Drainage Regime	225 mm public foul sewer crossing the site, operated by Wessex Water.

Greenfield Runoff Rate	Qbar = 5 L/s/ha
Infiltration Rate	1.47×10^{-5} m/s
Climate Change Allowance	40%
Proposed Surface Water Strategy	Gravity network discharging to a purpose-designed infiltration basin located in the north-eastern part of the site. Preliminary infiltration testing has confirmed that infiltration into the River Terrace Deposits is viable. No surface water will be discharged to the adjacent watercourse or public sewer. The basin will provide attenuation and infiltration for the 1 in 100-year + 40% climate change event.
Proposed Foul Water Strategy	Gravity foul network connecting to the existing 225 mm Wessex Water sewer on-site.

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1 Introduction

1.1 Terms of Reference

- 1.1.1 Rodgers Leask Ltd has been commissioned by Gleeson Land to prepare a Flood Risk Assessment and Drainage Strategy for the proposed development at Land at Gate Farm, High Street, Sutton Benger.
- 1.1.2 This report has been commissioned in support of an outline planning application to Wiltshire Council. Outline planning application (with all matters reserved except means of access, from the B4069) for up to 90 no. (class C3) residential dwellings (including 40% affordable dwellings) including the creation of new vehicular access (from the B4069), pedestrian and cycle paths, parking spaces, public open space, biodiversity enhancement, landscape planting, surface water attenuation, associated infrastructure and other associated works. A copy of the proposed site layout can be found in **Appendix A**.
- 1.1.3 Wiltshire Council are the Lead Local Flood Authority (LLFA), responsible for local flood risk management, including surface water, groundwater, and ordinary watercourses within the region. Wiltshire Council have published a Strategic Flood Risk Assessment (SFRA) which includes Level 1 and Level 2 assessments, as well as supplementary guidance for developers. These documents, along with local planning policy and drainage guidance, have been reviewed as part of the preparation of this report.
- 1.1.4 The Environment Agency website has been consulted regarding the Flood Zone and the risk of flooding of the site.
- 1.1.5 This report has been produced on behalf of the client, and no responsibility is accepted to any third party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of Rodgers Leask Ltd.

1.2 Legislation and Guidance

- 1.2.1 This report has been prepared in accordance with the Department for Communities and Local Government (DCLG) National Planning Policy Guidance, and the publication 'National Planning Policy Framework' published 27th March 2012, updated most recently on 19th December 2023.

- 1.2.2 Planning Practice Guidance was published on 29th November 2016 (updated on 24th June 2021). It contains guidance on Flood Risk and Coastal Change.
- 1.2.3 The latest version of Planning Policy Statement 25 was released on the 29th March 2010 and is now superseded by the NPPF.
- 1.2.4 NPPF can be downloaded free of charge from the internet at the following link:

<http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf>

1.3 Approach to the Assessment

- 1.3.1 This assessment seeks to consider the risks of flooding both to the site and to the wider area as a consequence of the development proposal. This also requires an assessment of the development constraints of the site and the opportunities offered by the existing infrastructure and natural environment in order to propose a strategy by which the site can be developed both economically and sustainably. This assessment draws upon our investigations regarding the local area.

1.4 Documents Reviewed

- Topographical Survey drawing
- Soilsdscapes Soil Viewer website
- British Geological Survey website
- Environment Agency website
- Wiltshire Council Level 1 Strategic Flood Risk Assessment
- Wiltshire Council Level 2 Strategic Flood Risk Assessment
- Wiltshire Council Drainage Guidance
- Wiltshire Local Flood Risk Management Strategy
- Wiltshire Council Groundwater Management Strategy 2016

2 Background Information

2.1 Site Location, Description and Details

2.1.1 Figure 2.1 below indicates the location of the site.



Figure 2.1 Land at Gate Farm, Sutton Benger – Site Location Plan

- 2.1.2 The site, as outlined above in Figure 2.1, has an overall area of approximately 4.97ha and is located immediately north of the B4069 approximately 500m to the west of the centre of Sutton Benger. Approximately centred at OS GR:E393999; N: 178513, with the nearest postcode of SN15 4RD.
- 2.1.3 The site currently comprises greenfield.
- 2.1.4 A topographical survey of the site area has been undertaken and is included in **Appendix B**.
- 2.1.5 The site is bordered by a main river to the northern boundary. The topography of the site generally slopes from south to north, with the highest point located in the southwestern corner at approximately 64.50 AOD, and the lowest point near the northeastern boundary adjacent to the watercourse, at around 57.75 AOD. This gradient directs surface water naturally toward the northern boundary.

2.2 Ground Conditions

- 2.2.1 A review of the Soilscales soil viewer indicates that the site comprises freely draining lime-rich loamy soils. These soils are typically well-drained and loamy in texture, with good permeability and a natural outfall to underlying chalk or limestone groundwater.
- 2.2.2 A review of the British Geological Survey's Geology Viewer map indicates that the site is underlain by bedrock geology of the Kellaways Sand Member, comprising pale grey silicate sandstone and siltstone with interbedded sandy and silty mudstone. This is sedimentary bedrock of Callovian Age, typically weakly cemented but locally forming harder dogger bands. In the northeastern extent of the site, this bedrock is overlain by superficial River Terrace Deposits (Type 1), consisting of sand and gravel with occasional lenses of silt, clay, or peat. These geological conditions suggest a potentially moderate to high permeability profile depending on local cementation and saturation.
- 2.2.3 Infiltration testing has been undertaken in the north-east and recorded an infiltration rate of 1.47×10^{-5} m/s, within the River Terrace Deposits. Groundwater seepage was observed in the test pit at approximately 2.0m depth. The infiltration test location plan and soakaway test results can be found in **Appendix G**.

2.3 Drainage Catchment Context

- 2.3.1 The site is located within the wider catchment of the River Avon, with greenfield runoff naturally draining northwards toward the adjacent main river along the northern boundary. Local infiltration also occurs across the site.
- 2.3.2 Under existing conditions, the main river acts as the downstream receptor for any surface-water runoff that does not infiltrate naturally within the site.
- 2.3.3 The Wessex Water sewer records are included in **Appendix D**. The records indicate the presence of a 225mm diameter public foul sewer running across the central portion of the site.
- 2.3.4 Although the existing greenfield site drains toward the watercourse with localised infiltration, the proposed development will not discharge to this river. Instead, all surface water runoff will be managed on-site via a dedicated infiltration basin located within the River Terrace Deposits, ensuring no off-site discharge and no increase in flood risk elsewhere.

3 Assessment of Flood Risk

3.1 Flood Risk from Fluvial Sources

- 3.1.1 The application site lies wholly within Flood Zone 1, indicating a low probability of fluvial flooding. Flood Zones 2 and 3 are restricted to land immediately north of the site boundary and are associated with the adjacent main river. No part of the proposed built development encroaches into these higher-risk areas, ensuring that residential and other vulnerable uses remain entirely within Flood Zone 1. A snapshot of the Environment Agency Flood Map for Planning is provided in Figure 3.1.

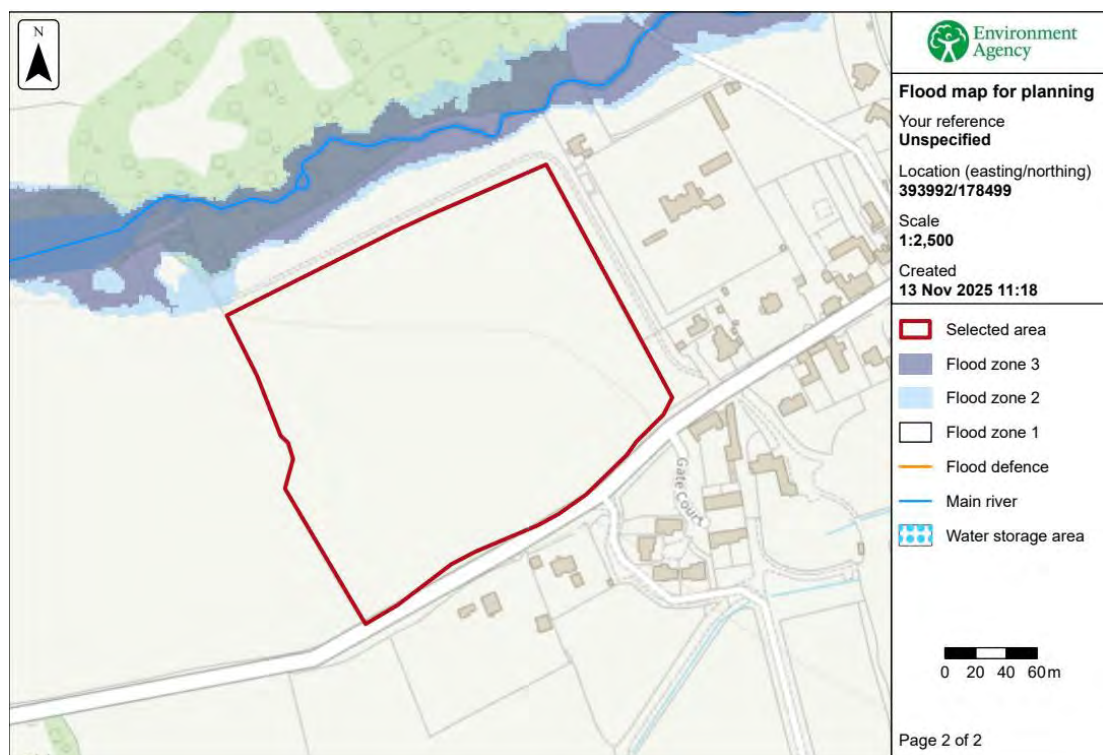


Figure 3.1 EA Flood Map for Planning

- 3.1.2 As such the site is not considered to be at risk of flooding from fluvial sources. Full product 4 data can be found in **Appendix I**.

3.2 Development Description and Planning Context

- 3.2.1 Outline planning application (with all matters reserved except means of access, from the B4069) for up to 90 no. (class C3) residential dwellings (including 40% affordable dwellings) including the creation of new vehicular access (from the B4069), pedestrian and cycle paths, parking spaces, public open space, biodiversity enhancement, landscape planting,

surface water attenuation, associated infrastructure and other associated works. A proposed site layout is included in **Appendix A**.

- 3.2.2 The design life of the proposed development is considered to be 100 years due to its residential nature.
- 3.2.3 In accordance with the NPPF Annex 3 Flood Risk Vulnerability Classification (shown below in Figure 3.2), the vulnerability of the development is deemed 'More Vulnerable'.

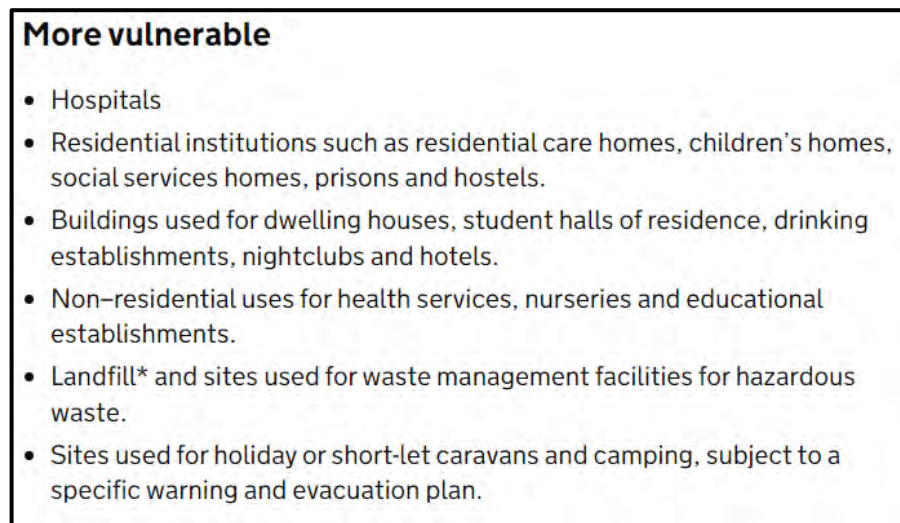


Figure 3.2 Extract from NPPF Annex 3 "Flood Risk Vulnerability Classification"

- 3.2.4 Table 2 of the NPPF Planning Practice Guidance (extract below in Figure 3.3) indicates the compatibility of vulnerability classes and flood zones. All forms of development are appropriate in Flood Zone 1 and therefore the proposed development is considered acceptable.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓ *

Figure 3.3 Extract of Table 2 of the NPPF Planning Practice Guidance

3.3 Flood Risk from Tidal Sources

- 3.3.1 At the lowest point the site has an elevation more than 57.75m above mean sea level. The site is therefore not considered to be at risk of flooding from tidal sources.

3.4 Flood Risk from Pluvial Sources (Surface Water)

- 3.4.1 A review of the Environment Agency's online flood mapping indicates most of the site has a low chance of flooding in the 1 in 1000-year event. Mapping of the extent of surface water flood risk is shown in Figure 3.4.

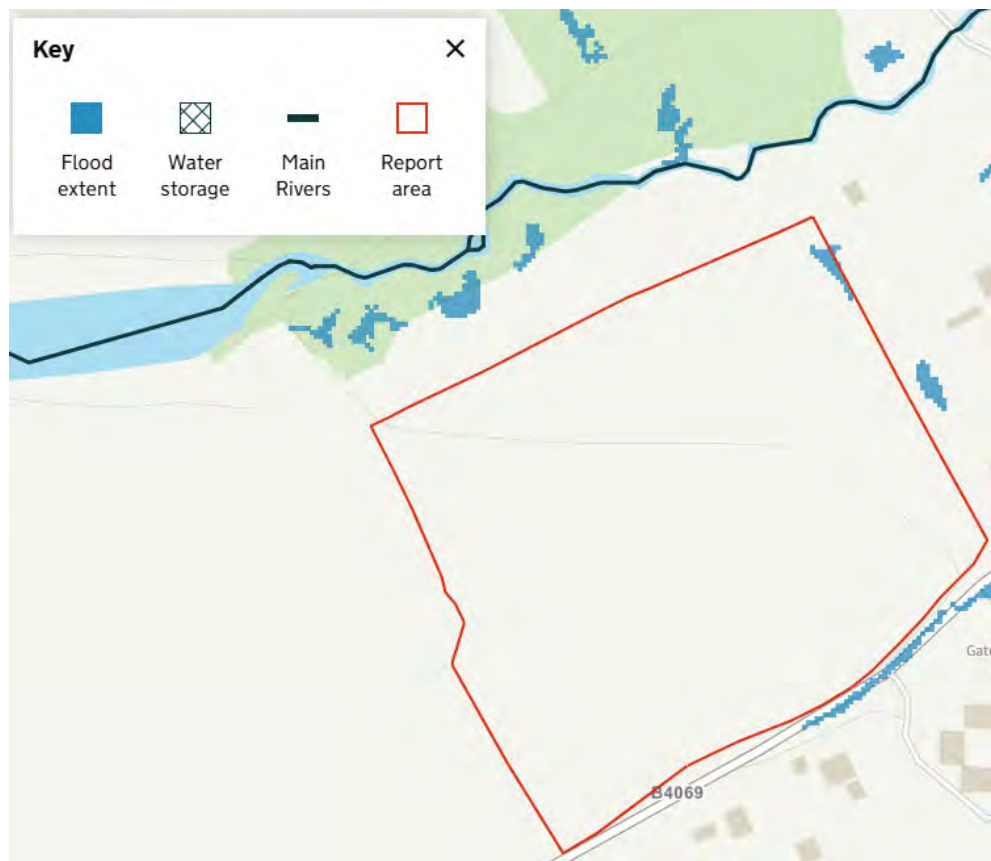


Figure 3.4 EA Surface Water Flood Risk Map

- 3.4.2 The Environment Agency surface water flood mapping shows that the site is predominantly at low risk of surface water flooding.
- 3.4.3 Mapped surface water ponding and flow paths are limited to off-site areas along the adjacent main river corridor and isolated low points within the Sutton Benger settlement, with no overland flow routes directed towards the site or its boundaries.
- 3.4.4 A small, isolated area of minor surface-water flood risk is shown on EA mapping at the southern site boundary within the B4069. This represents shallow, low-hazard ponding associated with the existing road corridor rather than overland flow routes towards the site. A further very small patch of shallow surface-water ponding is also shown within the north-eastern corner of the site boundary; this lies within open land and does not coincide with any proposed built development or internal access routes.
- 3.4.5 A proportionate review confirms that the proposed site layout, access design, levels strategy, and drainage proposals will ensure that occupiers and users remain safe from both current and future surface-water flood

risk for the lifetime of the development. The minor mapped areas of surface water risk do not affect the developable area, do not pose a hazard to safe access/egress, and are mitigated through the proposed positive drainage and exceedance routing, without increasing flood risk elsewhere. On this basis, no further mitigation or sequential testing is required in relation to these isolated features.

- 3.4.6 Accordingly, the residual risk of surface water flooding to the site is low, and no dedicated surface-water flood mitigation is required beyond the implementation of an appropriate drainage strategy.

3.5 Flood Risk from Ground Water

- 3.5.1 The Groundsure Enviro+Geo Insight report indicates that most of the site is classified as having a Negligible risk of groundwater flooding. Localised areas along the northern and eastern boundaries fall within zones of Low, Moderate, and High modelled groundwater flood risk, reflecting lower-lying land adjacent to the nearby watercourse. These higher-risk bands are limited to the site perimeter and do not extend into the proposed development area.
- 3.5.2 The Geo-Environmental Desk Study prepared by Rodgers Leask (2025) notes that groundwater may be encountered within deeper excavation, although there is no evidence of groundwater emergence or historic groundwater flooding at the surface within the site. Preliminary infiltration testing has demonstrated that infiltration is feasible within the upper River Terrace Deposits, with groundwater encountered at approximately 2.0m depth. Based on the available mapping, desk-based evidence, and preliminary infiltration results, the overall groundwater flood risk to the proposed development is considered low.
- 3.5.3 The observed infiltration rate of 1.47×10^{-5} m/s supports the feasibility of an infiltration-led drainage strategy and indicates that groundwater emergence is unlikely to impede infiltration performance.

3.6 Flood Risk from Infrastructure

- 3.6.1 The Environment Agency's online flood mapping shows that the site is outside of the area at risk of flooding from reservoirs. An extract of the mapping is shown in Figure 3.5 below.



Figure 3.5 EA Reservoir Flood Risk Map

- 3.6.2 Based on the above, the site is considered to be at low risk of flooding from the failure of infrastructure.

3.7 Strategic Flood Risk Assessment & Local Authority Documentation

- 3.7.1 The Wiltshire Council Local Flood Risk Management Strategy has been reviewed for any information to the site.
- 3.7.2 The Wiltshire Council Level 1 and 2 Strategic Flood Risk Assessment documents have also been reviewed.
- 3.7.3 Wiltshire Council SuDS and drainage guidance has been consulted to ensure the development complies with local requirements.

3.8 Sequential and Exception Test Requirements

- 3.8.1 Paragraph 174 and 175 of the NPPF states “The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood

risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).".

- 3.8.2 The PPG sets out the principles of the Sequential and Exception Tests and what is required to pass them when proposing new development in an area at risk of flooding. Paragraph 027 of the PPG states that "In applying paragraph 175 a proportionate approach should be taken. Where a site specific flood risk assessment demonstrates clearly that the proposed layout, design, and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development (therefore addressing the risks identified e.g. by Environment Agency flood risk mapping), without increasing flood risk elsewhere, then the sequential test need not be applied." The Sequential Test aims to promote development in areas of low flood risk. The Exception Test is triggered when development cannot be located within an area of suitably low risk flood risk.
- 3.8.3 The Exception Test requires a demonstration that flood risk to people and property can be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available. Essentially, the Exception Test requires the proposed development to show that it will provide wider sustainability benefits to the community that outweigh flood risk, and that it will remain safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.
- 3.8.4 Paragraph 180 of the NPPF States "Where planning applications come forward on sites allocated in the development plan through, the sequential test, applicants need not apply the sequential test again. However, the exception test may need to be reapplied if relevant aspects of the proposal had not been considered when the test was applied at the planmaking stage, or if more recent information about existing or potential flood risk should be taken into account".
- 3.8.5 As such, section 3.2 in this report provides evidence that a sequential approach has been taken to the development site itself.
- 3.8.6 An extract of PPG Table 2 is provided in Figure 3.6 which identifies that an Exception Test is not required for more vulnerable development located within Flood Zone 1.

	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b	Exception Test required*	X	X	X	✓*

**Figure 3.6 Extract of Flood Risk Vulnerability and Flood Zone
'Incompatibility' (Flood Risk & Coastal Change PPG Table 2)**

3.8.7 Whilst a small, isolated area of surface water risk is shown, this does not affect the developable area and is fully mitigated through the following measures

- All vulnerable development and internal access routes are located entirely within Flood Zone 1 and outside any mapped surface water flow paths or ponding areas.
- Finished Floor Levels will be raised a minimum of 150mm above surrounding ground levels to provide resilience against extreme rainfall events.
- An infiltration led drainage strategy is proposed, with runoff managed through an infiltration basin designed to accommodate up to and including the 1 in 100-year +40% climate change event, ensuring no increase in flood risk elsewhere.
- Exceedance flows will be directed away from buildings and toward the infiltration basin and adjacent green spaces, ensuring that any overland flow routing is safely managed within landscaped areas.

3.8.8 It is therefore considered that a sequential approach has been applied to the proposed development site and neither a formal Sequential Test, nor Exception Test, is required.

4 Surface Water Drainage Strategy

4.1 Hierarchy of drainage

- 4.1.1 In accordance with National Planning Policy Guidance, surface water runoff should be discharged from sites as high up the following hierarchy as practically possible:
1. Discharge into the ground
 2. Discharge to a watercourse
 3. Discharge to a surface water sewer
 4. Discharge to a combined water sewer
- 4.1.2 Infiltration testing has been undertaken in the north-east and recorded an infiltration rate of 1.47×10^{-5} m/s, within the River Terrace Deposits.
- 4.1.3 In accordance with the SuDS hierarchy, surface water runoff from the development will therefore be managed via a gravity drainage network discharging to an infiltration basin located within these deposits. No discharge to the adjacent main river or public sewer is required.

4.2 Existing Runoff Rate

The site is currently greenfield. Runoff rates have been calculated using the Greenfield Runoff Tool found on the UK SuDS website. The Greenfield runoff tool calculations can be referenced at **Appendix E**. As the proposed surface-water drainage strategy relies entirely on infiltration with no offsite discharge, the greenfield runoff rates are not used for design purposes.

- 4.2.1 The Greenfield runoff (IH124) rates are as follows:

Storm Event (yr)	QBar	1	30	100
Discharge (l/s)/ha	5	3.9	9.8	12.2

4.3 Design considerations

- 4.3.1 The proposed surface water drainage network has been designed to safely convey runoff from the development to a purpose-designed infiltration basin. The pipe network accommodates the 1 in 2-year rainfall event without surcharging.

- 4.3.2 The system will accommodate the 1 in 30-year rainfall event without any surface water flooding of external areas.
- 4.3.3 For the 1 in 100-year + 40% climate-change event, runoff is conveyed to the infiltration basin where it is stored and infiltrated into the underlying River Terrace Deposits. No off-site discharge, flow control or outfall is required.
- 4.3.4 Exceedance flows above the design event will be routed through landscaped areas and road corridors toward low-risk areas within the site boundary, ensuring that no exceedance flow is directed off-site.
- 4.3.5 The proposed impermeable area for the development has been calculated as 2.27ha
- 4.3.6 A 100-year design life has been adopted, consistent with the residential nature of the development.
- 4.3.7 A 10% allowance for urban creep has been applied to private impermeable areas to maintain long-term network resilience and accommodate potential future hard surfacing expansion.

4.4 Description of Proposed SuDS

- 4.4.1 The proposed surface-water drainage strategy has been developed in accordance with the SuDS hierarchy, the National Planning Policy Framework (NPPF), and Wiltshire Council LLFA Guidance. Infiltration has been prioritised as the primary means of surface-water disposal, consistent with the findings of the preliminary infiltration testing.
- 4.4.2 Sustainable Urban Drainage Systems (SuDS) are a range of techniques that aim to mimic the way rainfall drains in natural systems, reducing the hydraulic and hydrological impact of development on the local area and downstream catchments. At this outline stage, SuDS source-control measures have been incorporated where practicable, with additional on-plot and site-wide opportunities to be considered and refined at detailed design.
- 4.4.3 Runoff from roofs, roads, and paved areas will be conveyed through a gravity pipe network to a purpose-designed infiltration basin located in the north-eastern part of the site. Source-control measures such as permeable paving, filter drains or on-plot features remain under consideration and will be developed further at detailed design stage, subject to buildability and land-take constraints. A surface water drainage area plan can be found in **Appendix H**.

- 4.4.4 The infiltration basin forms the primary SuDS feature for the development, providing both attenuation and infiltration. The basin has been sized to accommodate runoff from storm events up to and including the 1 in 100-year + 40% climate-change allowance. All runoff will be retained and infiltrated within the basin, with no discharge to the adjacent main river. This ensures the development will not increase flood risk elsewhere. The recorded infiltration rate of 1.47×10^{-5} m/s has informed the preliminary basin design. A location plan of the infiltration and soakaway testing can be found in **Appendix G**.
- 4.4.5 A copy of the proposed drainage strategy drawing, showing the surface water sewer layout, infiltration basin, and outfall location, is included in **Appendix C**.
- 4.4.6 At this stage the strategy remains indicative, with final SuDS components to be confirmed during detailed design in agreement with Wiltshire Council.
- 4.4.7 Maintenance access to the basin, associated pipework, and SuDS components will be provided in accordance with CIRIA C753 and DCG requirements. A site-specific maintenance schedule will accompany the detailed design stage to ensure long-term performance.

4.5 Water Quantity

- 4.5.1 The proposed surface water system has been designed to incorporate sufficient storage within the infiltration basin to accommodate rainfall events up to and including the 1 in 100 year plus 40% climate change event. This ensures flooding is contained within the site and that no surface-water runoff is discharged off-site or exacerbates flood risk elsewhere.
- 4.5.2 Surface water network modelling has been undertaken to determine the storage volume within the basin and to assess the performance of the system. A full set of the modelling results can be found in **Appendix F**.
- 4.5.3 The modelling has been based on impermeable areas measured from the site proposal, including a 10% urban-creep allowance.
- 4.5.4 A summary table of the required storage is provided in Table 1 below.

SuDS Feature	Imp Area (ha) + UC	Infiltration Volume (m ³)
Infiltration Basin	2.27	2126
Total	2.27 ha	2126

Table 1 – Infiltration Volume Summary

- 4.5.5 The infiltration basin has been designed with 1 in 3 side slopes and a maximum design water depth of 1.35m. A freeboard above the maximum water level of 0.3m has been allowed for.

4.6 Water Quality

- 4.6.1 A water-quality assessment has been undertaken to ensure that runoff from the proposed development receives appropriate treatment prior to infiltration, in accordance with CIRIA C753.
- 4.6.2 The three step simple index approach, as outlined in 'The SuDS Manual' CIRIA C753 Box 26.2 has been used within this report to assess the pollution hazard and the treatment provided by the proposed SuDS components.
- 4.6.3 Step 1 requires pollution hazard indices to be assigned for the proposed land use as defined in Table 26.2 of Ciria C753. The most onerous proposed land use for the development site has been assessed to be '*individual driveways, residential car parks, low traffic roads and non-residential car parks with infrequent change (schools/offices)*'. The commensurate pollution hazard indices are set out in Table 2.

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydro-carbons
Residential highways and parking	Low	0.5	0.4	0.4

Table 2 – Pollution hazard indices

- 4.6.4 Step 2 requires an assessment of the SuDS pollution mitigation index which is compared with the pollution hazard index from step 1. Where flows pass through more than one feature the mitigation index of subsequent SuDS features is halved. These have been set out in Table 3.

SuDS Feature or treatment train	Total Suspended Solids	Metals	Hydro-carbons
Infiltration Basin	0.4	0.4	0.4
<i>Greater than or equal to hazard index?</i>	Yes	Yes	Yes

Table 3 – Pollution mitigation indices

- 4.6.5 As all treatment combinations provide mitigation indices greater than the hazard indices the proposed surface water drainage strategy is considered to provide sufficient water quality treatment for both catchments prior to disposal off site.

4.7 Amenity Value

- 4.7.1 In line with the guidance document 'Water.People.Places' and best practice, SuDS features should provide amenity value to local residents by offering multi-functionality, visual character, accessibility and legibility/engagement opportunities.
- 4.7.2 The SuDS features have been carefully designed to be integrated into the open space area of the site. Planting should be used to enhance the character of the infiltration basin as well as support biodiversity and support water quality treatment.
- 4.7.3 The infiltration basin will be adjacent to the watercourse and overlooked by a significant number of dwellings. Due to the clear visibility, there will be inherent safety and security benefits.
- 4.7.4 For educational purposes, information boards can be located at access points to the infiltration basin which explain what they should look like in typical conditions as well as in extreme wet weather conditions. They can also display safety advice and information about wildlife.

4.8 Biodiversity Opportunities

- 4.8.1 The proposed infiltration basin will offer significant opportunities to support biodiversity through habitat provision, connectivity and resilience.
- 4.8.2 The infiltration basin will provide water quality treatment, as outlined in Section 4.6, which will reduce contaminants and could help promote habitat creation.
- 4.8.3 The infiltration basin will be planted with suitable species of shrubs and wildflower. Species should be water and drought tolerant.

4.9 Proposed Development Levels

- 4.9.1 It is recommended that Finished Floor Levels (FFLs) across the site are set a minimum of 150 mm above proposed adjacent ground levels to provide resilience to surface-water flooding. While Flood Zones 2 and 3 associated with the main river lie outside the red line boundary, the proposed development platform will remain at least 600 mm above the nearest

fluvial flood zone extents, ensuring an appropriate margin of safety and confirming that the fluvial flood risk does not influence the site layout.

4.10 Exceedance Flows

- 4.10.1 The effects of flooding caused by extreme rainfall events beyond those that have been reasonably allowed for, or caused by a blockage, can be mitigated by utilising roads and public open space to retain and direct surface water away from dwellings.

5 Foul Water Drainage Strategy

- 5.1.1 The Wessex Water Sewer records for the site locality can be found in **Appendix D**.
- 5.1.2 Foul water from the proposed development will discharge to the existing 225mm diameter public foul sewer that crosses the site, as confirmed by Wessex Water's planning liaison response in **Appendix D**. Wessex Water have confirmed that they will accommodate domestic foul flows from the development on a size-for-size connection basis, subject to application and technical agreement.
- 5.1.3 A gravity foul drainage network will collect flows from all dwellings and convey them to the agreed point of connection within the public sewer. No surface water, land drainage, or groundwater will be discharged into the foul system, in accordance with Wessex Water requirements and Building Regulations Part H.
- 5.1.4 The foul network will be offered for adoption by Wessex Water under a Section 104 agreement, with all sewers, manholes, and connection details designed in accordance with the Design and Construction Guidance (DCG). Wessex Water will maintain the adopted infrastructure following completion.
- 5.1.5 A copy of the proposed drainage strategy plan indicating the schematic foul water sewer design and outfall points can be found in **Appendix C**.

6 Drainage Maintenance

6.1 Adoption and Responsibilities

- 6.1.1 It is proposed for all foul water sewers to be offered for adoption by Wessex Water under a Section 104 application.
- 6.1.1 It is proposed for all surface water sewers to be offered for adoption by Wessex Water under a Section 104 application.
- 6.1.2 The infiltration basin will be maintained by either Wessex Water or the site wide management company.

6.2 Maintenance Requirements

- 6.2.1 To promote the functioning of the SuDS system in perpetuity a robust inspection and maintenance regime must be adhered to. This should be based on recommendations in CIRIA 753.
- 6.2.2 The maintenance and inspection regime for the infiltration basin should include, but not be limited to:
 - Removal of litter and debris – Monthly
 - Cutting of path grass/vegetation – Monthly in season
 - Cutting of meadow grass – Half yearly
 - Inspection of inlets and outlets for blockages – Monthly
 - Check function of penstocks/flap valves – Monthly
 - Inspection integrity of fencing/gratings – Half yearly
 - Inspection and removal of silt build-up at inlet and outlet – Monthly
 - Management of nuisance vegetation – Monthly
 - Replanting of damaged vegetation – As required.

7 Mitigation and Management of Residual Risks

7.1 Access to and Egress from the site

- 7.1.1 Access to and egress from the site will be taken from High Street (B4069) to the south of the site. All access routes are located within Flood Zone 1 and are therefore considered to provide safe and suitable access to and from the site during all flood events.

7.2 Finished Floor Levels (FFLs)

- 7.2.1 It is recommended that Finished Floor Levels (FFLs) across the site are set a minimum of 150 mm above proposed adjacent ground levels to provide resilience to surface-water flooding. While Flood Zones 2 and 3 associated with the main river lie outside the red line boundary, the proposed development platform will remain at least 600 mm above the nearest fluvial flood zone extents, ensuring an appropriate margin of safety and confirming that the fluvial flood risk does not influence the site layout.

8 Conclusion

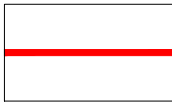
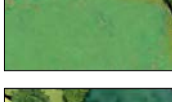
- 8.1.1 The proposed surface-water drainage strategy has been designed in accordance with the SuDS hierarchy, the National Planning Policy Framework (NPPF), Wiltshire Council LLFA guidance, and CIRIA C753 – The SuDS Manual.
- 8.1.2 Preliminary infiltration testing has demonstrated suitable infiltration potential within the north-eastern part of the site. Surface-water runoff from the development will therefore be managed via a purpose-designed infiltration basin, with no off-site discharge required.
- 8.1.3 All runoff from roofs, roads, and paved areas will be conveyed by a gravity drainage network to the infiltration basin, where it will be stored during storm events and infiltrated into the underlying River Terrace Deposits. This ensures that surface-water runoff is retained entirely within the site boundary and does not enter the adjacent river.
- 8.1.4 The proposed drainage system incorporates appropriate SuDS components and provides sufficient treatment in accordance with CIRIA C753, ensuring the effective management of both water quantity and water quality prior to infiltration.
- 8.1.5 Foul flows will be conveyed via a gravity foul network discharging to the existing 225 mm Wessex Water foul sewer that crosses the site, with acceptance confirmed in principle through the Developer Enquiry process.
- 8.1.6 A detailed flood-risk assessment has been undertaken, confirming that the site lies entirely within Flood Zone 1, with low risk from all other assessed flood sources.
- 8.1.7 The proposed development will not increase flood risk to adjacent land or downstream receptors. The use of on-site infiltration, exceedance routing, and a robust long-term maintenance regime ensures that the development remains safe, compliant, and sustainable in flood-risk terms.

Appendix A - Proposed Site Layout



The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
B Site Boundary updated	19.11.25	SM	FM

-  Site Boundary
-  Dwelling House
-  Gardens
-  Primary Vehicular Route
-  Formal Square
-  Shared Surface
-  Lane / Private Drive
-  Parking
-  Footpath
-  Play Space
-  Attenuation Basin
-  Proposed Tree Planting
-  Existing Tree Planting

Project
Sutton Benger

Drawing Title
Illustrative Site Layout

Date
31.07.25

Scale
1:1,250 @A2

Project No
333102291

Drawn by
M.D.

Check by
F.M./S.B.

Revision
B





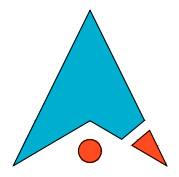
Stantec

DRAFT

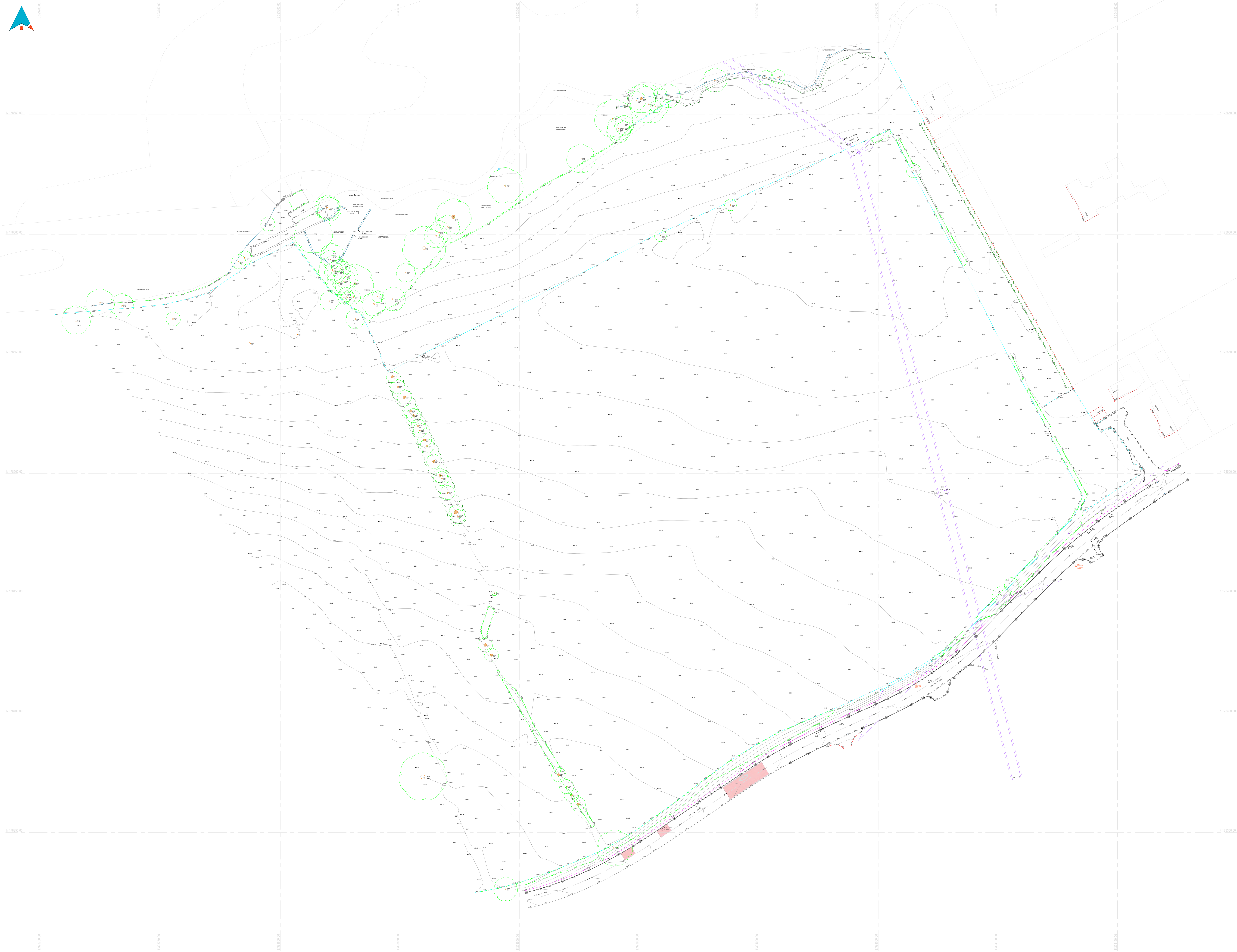
Stantec UK Limited
The Blade
Abbey Square
Reading
RG1 3BE
T: 0118 9430 000

stantec.com\uk

Appendix B- Topographical Survey



© 2023 Corner Point Surveys Ltd



LEGEND				
BUILDINGS	CANOPY	CPY	EV	EAVES
	DOWNPIPE	DP	GUT	GUTTER
	DOORLINE	DAL	PRL	ROOF LINE
BOUNDARIES	WINDOW LINE	WOL	VP	VENT PIPE
	ARBOUR BARRIER	AB	VS	HOARDING / HEDGE
	BARRIER	BAR	RF	POST & RAIL FENCE
TOPOGRAPHY	BRICK WALL	BW	FW	POST & WIRE FENCE
	CLOSE BOARD FENCE	CBF	RW	RETAINING WALL
	HEDGE	HE	SW	STONE WALL
STREET FURNITURE	BANK BASE	BB	SB	TREE CLUSTER
	BANK TOP	BT	VS	VEGETATION
	BOLLARD	BO	TP	TELECOM POST
UTILITIES	LAMP POST	LP	KB	HERB BASE
	TACTILE PAVING	TPV	LP	LAMP POST
	DROP KERB	DKB	FO	REFLECTOR POST
STRUCTURE	FOOTPATH	FP	RP	TACTILE PAVING
	ROAD SIGN	RS	TRV	MANHOLE
	AC/DRAIN	AD	OV	INSPECTION CHAMBER
GENERAL	BT MANHOLE	BT	IC	WATER METER
	CABLE TV	CTV	MM	CONTAINER
	ELECTRICITY BOX	EB	SDR	SCOFFIT LEVEL
GENERAL	EARTH ROD	ER	ST	UNABLE TO SURVEY
	FIRE HYDRANT	PH	WM	WATER LEVEL
	GAULT	GU	BT	DRAINER
GENERAL	COLUMN	CON	BT	GATE
	CONCRETE PLINTH	CP	BT	
	APPROXIMATE	AP	BT	
GENERAL	APPROXIMATE	AP	BT	
	APPROXIMATE	AP	BT	
	APPROXIMATE	AP	BT	



Rev

Date

Description

By

1	2023-05-25	Initial Survey	JPW
2	2023-05-26	Topographical Survey	JPW
3	2023-05-27	Final Survey	JPW

Dimensions to be verified on site.
This drawing should not be scaled. Use figures
Dimensions only.
Any discrepancies should be referred to the Engineer
prior to work being put in hand.
This drawing is copyright.

THE SURVEY
ASSOCIATION
FULL MEMBER

Corner Point Surveys Limited
Cottons Road, Village Way
Greenwood Business Park
Cardiff
CF15 7HG

020 20 880 100
cardiff@cornerpointsurveys.co.uk
www.cornerpointsurveys.co.uk

Client

gleeson

Promoting Land. Unlocking Value.

Project

SUTTON BENDER

Title

TOPOGRAPHICAL
SURVEY

Drawing Name

INFORMATION

Drawn By	Checked By	Drawn Date	Scale
JPW	JPW	MAY25	1:500

Project No	Drawing No	Revision
S25048	001	0

Rev

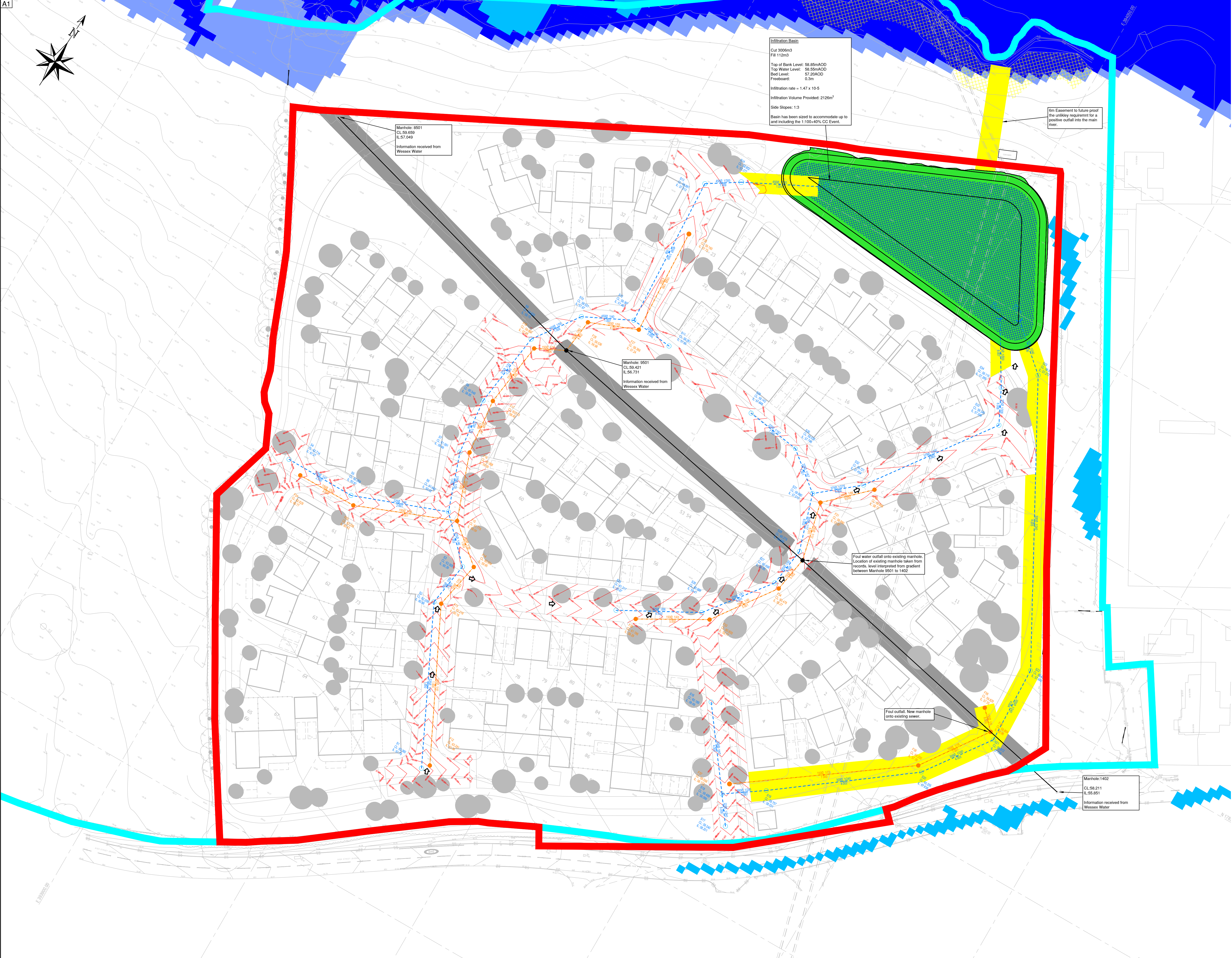
Date

Description

By

1	2023-05-25	Initial Survey	JPW
2	2023-05-26	Topographical Survey	JPW
3	2023-05-27	Final Survey	JPW

Appendix C – Drainage Strategy Plan



- GENERAL NOTES**
- Scale to be used for planning purposes only
 - This drawing is to be read in conjunction with all other relevant drawings and details.
 - Should there be any conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed PRIOR to construction on site.
 - Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the Contractor commence site works prior to such approval being provided it is entirely at their own risk.
 - Sketch proposals are for illustrative purposes only and as such are subject to detailed site investigation including ground conditions, contaminants, drainage, design and planning / density negotiations.
 - All dimensions are in metres unless otherwise stated.
 - The Rodgers Leask Designer's Risk Assessment(s) for this project must be reviewed PRIOR to the commencement of any works on site.

Key:

- Indicative Site Boundary
- Wider Land Holding
- Indicative Surface Water Sewer Network
- Indicative Foul Water Sewer Network
- Proposed Sewer Easements
- Existing Sewer Easement
- 8m No Activity Zone from Main River
- Flood Zone 2
- Flood Zone 3
- Surface Water Flooding
- Exceedance Overland Flow Route
- Proposed Infiltration Basin

Health and safety symbols refer to reference numbers indicated on Designers Risk Assessment number: 25317-RLL-25-XX-HS-C-0001

Health & Safety Information Key

- Used to provide design specific safety information that may not be obvious to a competent contractor but may be useful
- Used to restrict/prevent a possible action, e.g. stop construction traffic from entering an area
- Used to warn of significant design hazards, adding recommendations
- Used to encourage a positive action, e.g. use of robust protection for inspection chambers

P03	02.12.25	Updated key and flood zone transparency.	KN	TN
P02	28.11.25	Updated to suit infiltration.	JEB	TN
P01	21.11.25	New layout added.	JEB	TN
Rev	Date	Amendments	By	Chk



Client
GLEESON LAND

Project
**LAND AT GATE FARM,
HIGH STREET,
SUTTON BINGER**

Drawing Title
DRAINAGE STRATEGY

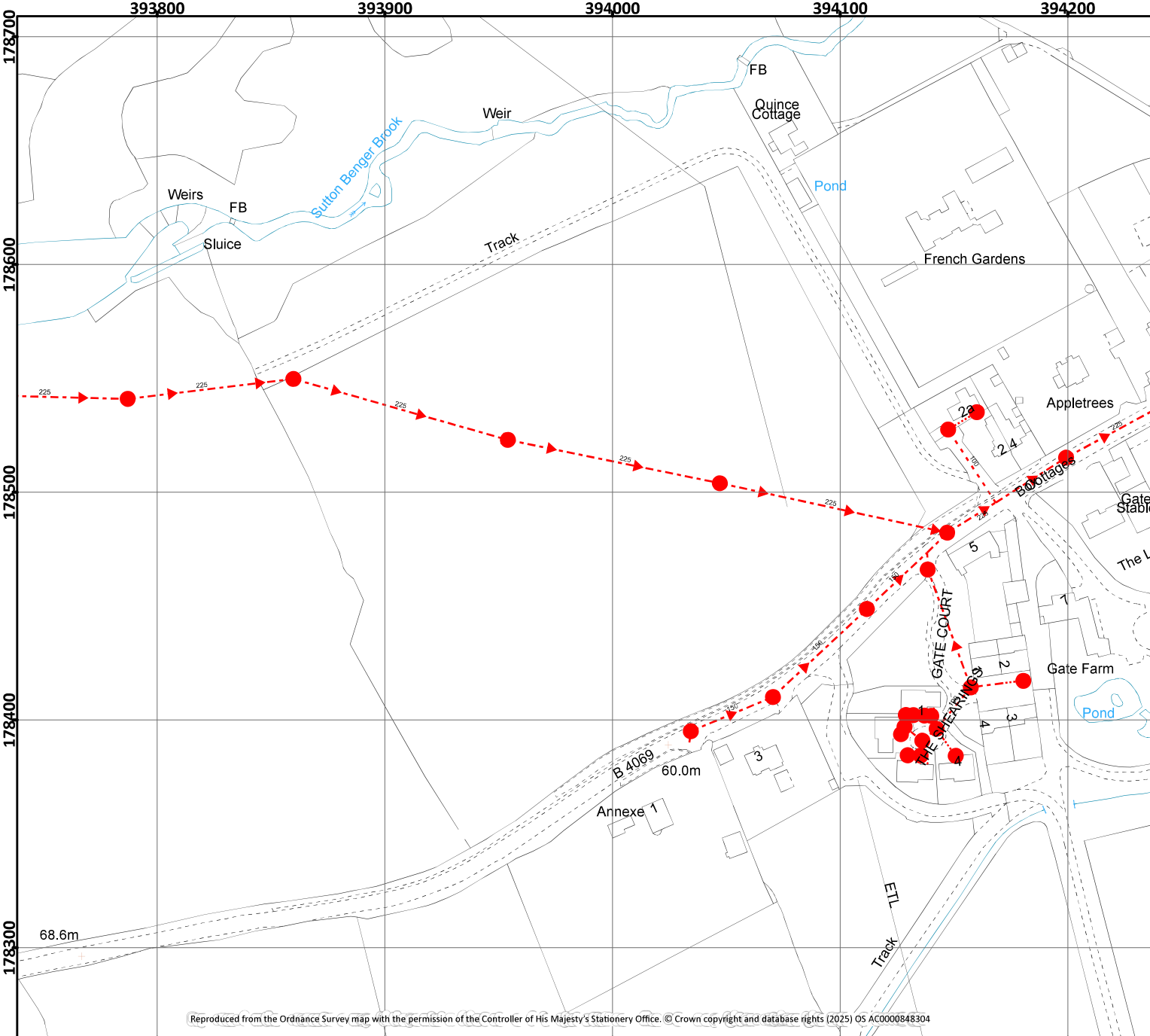
Status
PLANNING

Scale	Drawn	Checked	Date
1:500	JEB	TN	07/11/25

Drawing Number	Revision
25317-RLL-22-XX-DR-C-2000	P03

BIM Drawing Reference

Appendix D - Wessex Water Development Enquiry & Sewer Records



WASTE

PUBLIC SEWERS

- Foul Sewer
- Surface Water Sewer
- Combined Sewer
- Rising Main
- Standby Rising Main
- Syphon
- Overflow
- Use Unknown

OTHER STRUCTURES

- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor
- Thrust Block
- Kiosk

NON-PUBLIC SEWERS & PIPELINES

- Private Sewer/Drain
- Highway Drain
- Culverted Watercourse
- Abandoned Sewer
- Status Unknown
- Section 104 - Foul
- Section 104 - Surface
- Section 104 - Combined
- Private Rising Main
- Effluent Disposal Main
- Cable

STRUCTURES

- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Outfall
- Inlet
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Telemetry Point

- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Washout
- Hatch Box

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

SUPPLY

WATER MAINS

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

FITTINGS

- Fire Hydrant
- Washout Hydrant
- Other Fitting

Printed: 07/05/2025

Map Scale - 1:2,500

Information in this plan is provided for identification purposes only. No warranty as to accuracy is given or implied. The precise route of pipe work may not exactly match that shown. Wessex Water does not accept liability for inaccuracies. Sewers and lateral drains adopted by Wessex Water under the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011 are to be plotted over time and may not yet be shown. In carrying out any works, you accept liability for the cost of any repairs to Wessex Water apparatus damaged as a result of your works. You are advised to commence excavations using hand tools only. Mechanical digging equipment should not be used until pipe work has been precisely located. If you are considering any form of building works and pipe work is shown within the boundary of your property or a property to be purchased (or very close by) a surveyor should plot its exact position prior to commencing works or purchase. Building over or near Wessex Water's apparatus is not normally permitted.

From: [Stella Davies](#)
Sent on: 08 July 2025 13:02:19
To: [Kamil Nawaz](#)
Subject: WW Dev Resp ST97NW/ 39 1Land North of High St, Sutton Benger 90 dwellings -drainage
Attachments: WW Dev Map ST97NW_391 Land North of High St, Sutton Benger.pdf (1.07 MB)

Follow up: Follow up

ALERT: External email. Check the address. Think before you click links and attachments.

Dear Mr Nawaz,

Thank you for your recent online enquiry reading provision of foul drainage and water supply for the proposed up to 90 dwelling development at the above site.

Please note that following Assets are located within the red line boundary of the proposed site:

Existing Apparatus

Apparatus Type

225 mm dia gravity foul sewer main

Stand -off either side

min stand-off 3m either side

Note: There must be no buildings or structures within the minimum stand-off zones either side of the pipes. This includes no surface water attenuation features or associated earthworks in the easement strip, changes in ground levels resulting in additional loading or excavation. No tree planting within 6 metres
The sewers and associated easement strips must not run through enclosed private rear gardens.
Public manholes and sewers must remain in open access areas or public highways. Wessex Water require unrestricted access to maintain and repair our apparatus.
All apparatus must be accurately located and marked on site. Apparatus and easement corridors must be clearly marked on all development drawings to ensure there are no conflicts with buildings or within rear garden boundaries.

Water Supply – Point of Connection

A development of this scale requires a water main connection with a minimum diameter of 90 mm.

The nearest suitable point of connection for the proposal is the 125mm dia Water Main in High Street.

Please note that the cost of any new connection or the upsizing of the existing main must be borne by the developer. Wessex Water can provide a point of connection for new water mains to be laid into the development site, either through a Section 41 agreement or a self-lay arrangement.

Developers may connect to our water network on a 'size for size' basis at their cost and Wessex Water will undertake any network reinforcement that may be required to accommodate granted development, this is funded through our infrastructure charging arrangements.

For more details and guidance for applying to connect to our networks please see our website:

<https://www.wessexwater.co.uk/services/building-and-developing/building-multiple-properties-or-large-developments>

Foul Drainage

Wessex Water will accommodate domestic type foul flows in the public foul sewer with connections made on a size for size basis, Developers fund the cost of connecting to the nearest 'size for size' sewer and Wessex Water will manage the sewer network to accommodate foul flows from granted development. We fund this through our infrastructure charging arrangements.

The most appropriate point for connection from the site would be 225mm diameter public foul sewer crossing the site. The point of connection to the public network is by application and agreement with Wessex Water and subject to satisfactory engineering proposals constructed to current adoptable standards. The developer should contact the local development team development.north@wessexwater.co.uk to agree proposals for the Section 104 adoption or Section 106 connection and submit details for technical review prior to construction. We will not accept foul connections from below ground level, foul flows from below ground level must be pumped to ground level prior to connection to the public foul sewer.

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

Surface Water Drainage

Surface water must be disposed of via the SuDS Hierarchy which is subject to Building Regulations and NPPF.

No surface water runoff, land drainage or ground water will be accepted into a public sewer that carries sewerage, either directly or indirectly.

The National Planning Policy Framework (NPPF) mandates that Sustainable Drainage Systems (SuDS) must be incorporated into new developments to manage surface water runoff, mitigate flood risks, and provide additional benefits, including enhanced water quality and green spaces. However, the proposed surface water drainage strategy fails to meet NPPF requirements regarding SuDS and sustainable development. Additionally, it omits compliance with the surface water discharge hierarchy.

In line with the drainage hierarchy outlined in Approved Document H of the Building Regulations, Planning Practice Guidance, and the necessity to address water scarcity, all surface water runoff should aim to be discharged as high up the following hierarchy as feasible:

- Rainwater reuse through harvesting or greywater recycling
- An adequate soakaway or other infiltration system
- A hybrid solution involving infiltration and discharge to a surface water body
- Discharge directly to a surface water body (e.g., an ordinary watercourse)
- Discharge to a surface water sewer, highway drain, or other drainage system

Proposed surface water strategy to be agreed with LLFA. Review of the mapping indicates presence of land drainage features in the vicinity of the site.

Wessex Water statement on surface water discharge can be accessed via the following link:

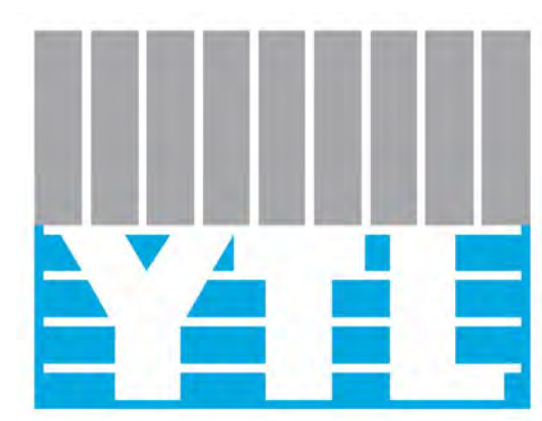
<https://developerservices.wessexwater.co.uk/media/m4rjrfmg/wwds-dev063p-rainwater-drainage-policy.pdf>

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

Note: These comments are based upon known circumstances prevailing at the time of writing. A review of the contents of this email is required where 18 months or more have elapsed since issue or in the light of significant changes likely to impact upon the response (e.g. changes in development numbers or phasing). Please email review requests to planning.liaison@wessexwater.co.uk

Best Regards,

Stella Davies
Senior Planning Liaison Engineer



Wessex Water
YTL GROUP

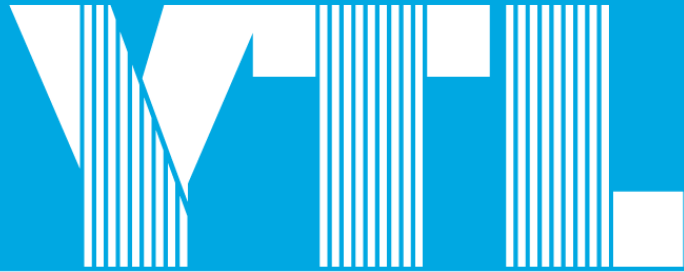
Wessex Water
Operations Centre, Claverton Down, Bath BA2 7WW

Web ytl.com | wessexwater.co.uk



Wessex Water
YTL GROUP

FOR YOU. FOR LIFE



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This email is being sent to you on behalf of Wessex Water Limited, a company registered in England and Wales with number 02366633. Its registered office is Wessex Water Operations Centre, Claverton Down Road, Claverton Down, Bath, BA2 7WW.

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This email is being sent to you on behalf of Wessex Water Services Limited, a company registered in England and Wales with number 02366648. The registered office is Wessex Water Operations Centre, Claverton Down Road, Claverton Down, Bath, BA2 7WW.

Appendix E – Greenfield Runoff Tool

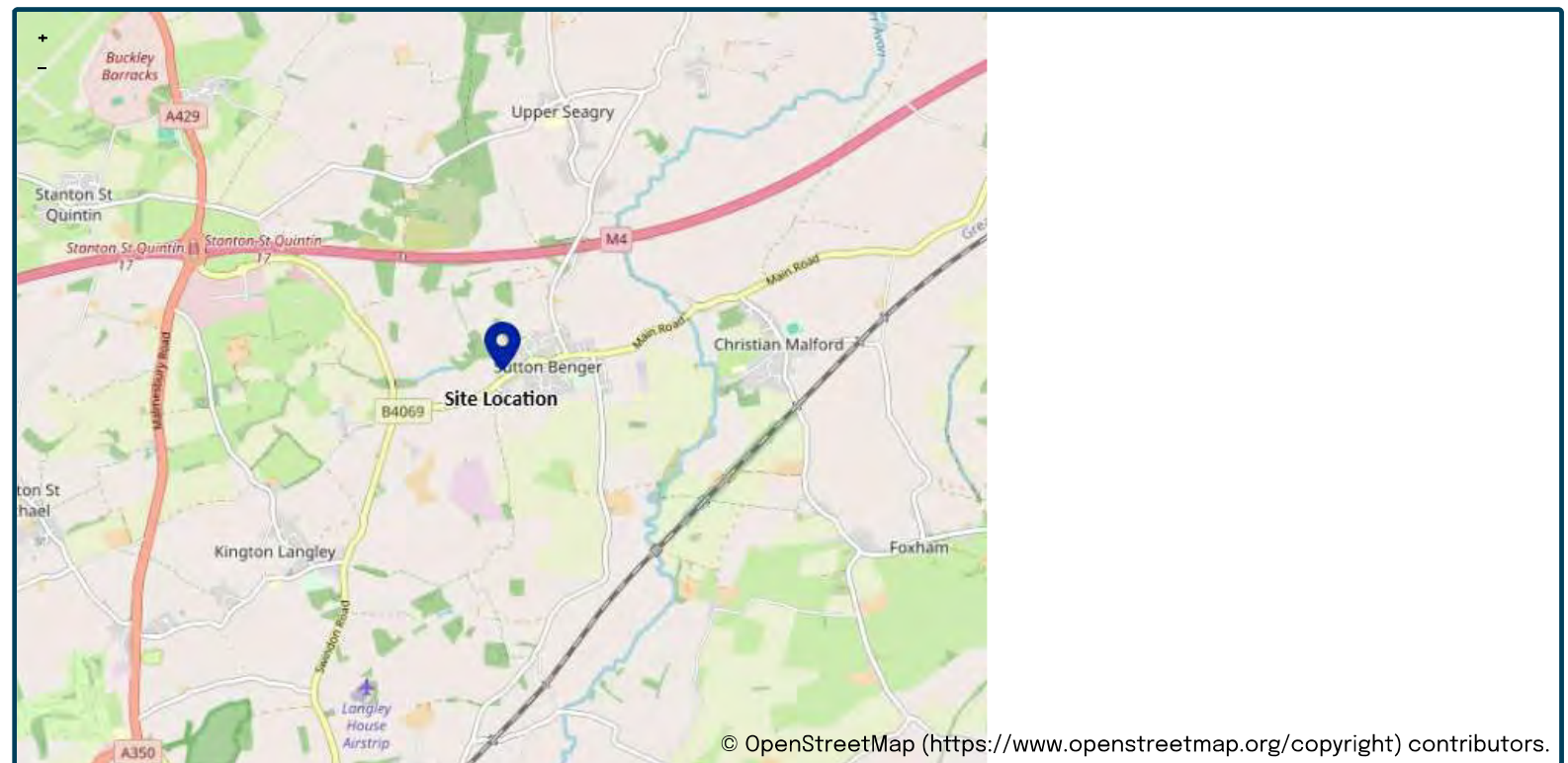
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	30/05/2025
Calculated by	Thomas Nunn
Reference	Sutton Benger
Model version	2.0.1

Location

Site name	Sutton Benger
Site location	Sutton Benger



Site easting	394167
Site northing	178400

Site details

Total site area (ha)	1	ha
----------------------	--------------------------------	----

Greenfield runoff

Method

Method	IH124		
--------	-------	--	--

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	723	mm	723
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		
QBar (IH124) (l/s)	5	l/s	

Growth curve factors

	<u>My value</u>		<u>Map value</u>
Hydrological region	8		8
1 year growth factor	0.78		
2 year growth factor	0.93		
10 year growth factor	1.49		
30 year growth factor	1.95		
100 year growth factor	2.43		
200 year growth factor	2.78		

Results

Method	IH124	
Flow rate 1 year (l/s)	3.9	l/s
Flow rate 2 year (l/s)	4.7	l/s
Flow rate 10 years (l/s)	7.5	l/s
Flow rate 30 years (l/s)	9.8	l/s
Flow rate 100 years (l/s)	12.2	l/s
Flow rate 200 years (l/s)	13.9	l/s

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.1) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix F - Hydraulic Modelling Results

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)		Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)		Minimum Backdrop Height (m)	0.200
Ratio-R		Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)		Enforce best practice design rules	✓

Nodes

Name	Area (ha)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
J1	2.270	58.850	7.896	81.068	1.650
J2		58.850	60.445	52.791	1.650

Simulation Settings

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

Storm Durations

60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

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

Node J1 Infiltration Basin Storage Structure

Base Inf Coefficient (m/hr)	0.05300	Invert Level (m)	57.200
Side Inf Coefficient (m/hr)	0.05300	Time to half empty (mins)	
Safety Factor	2.0	Analyse flow through structure	x
Porosity	1.00		

Inlets

J2

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1200.0	1200.0	1.650	1884.8	1921.8

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute summer	J1	960	58.584	1.384	176.8	2055.8230	0.0000	OK
960 minute summer	J2	975	58.581	1.381	82.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
960 minute summer	J1	Infiltration	13.3

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S1	0.221	1.350	Type C	63.360	61.790	1.345	393978.733	178392.998
S2	0.090	1.350	Type C	62.209	60.660	1.249	393957.099	178437.961
S3	0.078	1.350	Type C	62.005	60.390	1.240	393959.231	178451.318
S4	0.214	1.350	Type C	62.714	61.270	1.219	393898.241	178453.188
S5	0.044	1.350	Type C	62.259	60.810	1.224	393919.687	178453.120
S6	0.019	1.350	Type C	61.662	60.020	1.267	393947.378	178463.421
S7	0.000	1.350	Type C	61.091	59.460	1.256	393941.424	178480.627
S8	0.025	1.350	Type C	60.549	58.950	1.224	393939.729	178497.370
S9	0.290	1.350	Type C	59.820	58.150	1.220	393942.994	178520.536
S10	0.016	1.350	Type C	59.551	57.870	1.231	393952.634	178533.856
S11	0.000	1.350	Type C	59.261	57.850	1.186	393979.739	178539.349
S12	0.047	1.350	Type C	59.367	57.467	1.450	393966.782	178540.748
S13	0.143	1.350	Type C	58.881	57.313	1.118	393964.744	178586.751
S14	0.120	1.500	Type C	58.652	57.277	0.925	393973.936	178592.587
S15	0.000	0.000	Type C	58.850	57.200	1.200	393994.513	178602.939

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S1	61.790	S2	60.735	Circ	0.225mØ	49.897	47.3	0.600	1.345	1.249
1.001	S2	60.660	S3	60.465	Circ	0.3mØ	13.526	69.4	0.600	1.249	1.240
1.002	S3	60.390	S6	60.020	Circ	0.375mØ	16.940	45.8	0.600	1.240	1.267
2.000	S4	61.270	S5	60.810	Circ	0.225mØ	21.445	46.6	0.600	1.219	1.224
2.001	S5	60.810	S6	60.170	Circ	0.225mØ	29.546	46.2	0.600	1.224	1.267
1.003	S6	60.020	S7	59.460	Circ	0.375mØ	18.207	32.5	0.600	1.267	1.256
1.004	S7	59.460	S8	58.950	Circ	0.375mØ	16.828	33.0	0.600	1.256	1.224
1.005	S8	58.950	S9	58.225	Circ	0.375mØ	23.395	32.3	0.600	1.224	1.220
1.006	S9	58.150	S10	57.870	Circ	0.45mØ	16.442	58.7	0.600	1.220	1.231
1.007	S10	57.870	S12	57.480	Circ	0.45mØ	15.738	40.4	0.600	1.231	1.437
3.000	S11	57.850	S12	57.705	Circ	0.225mØ	13.032	89.9	0.600	1.186	1.437
1.008	S12	57.467	S13	57.313	Circ	0.45mØ	46.048	300.0	0.600	1.450	1.118
1.009	S13	57.313	S14	57.277	Circ	0.45mØ	10.889	300.0	0.600	1.118	0.925
1.010	S14	57.277	S15	57.200	Circ	0.45mØ	23.034	300.0	0.600	0.925	1.200

Outfall Details

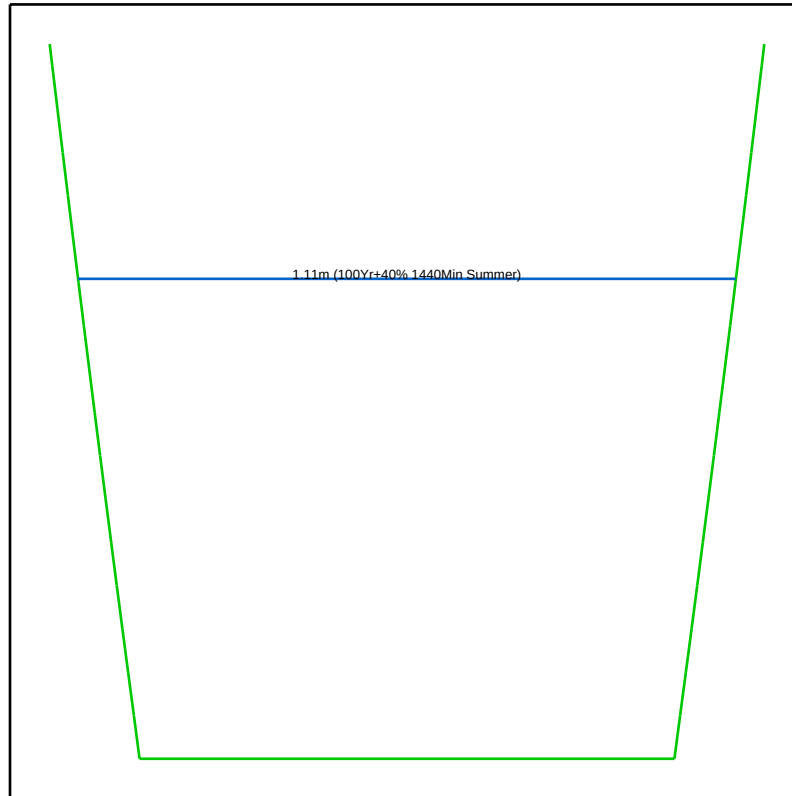
Outfall Manhole S15 : Infiltration Pond

Flow Control Details

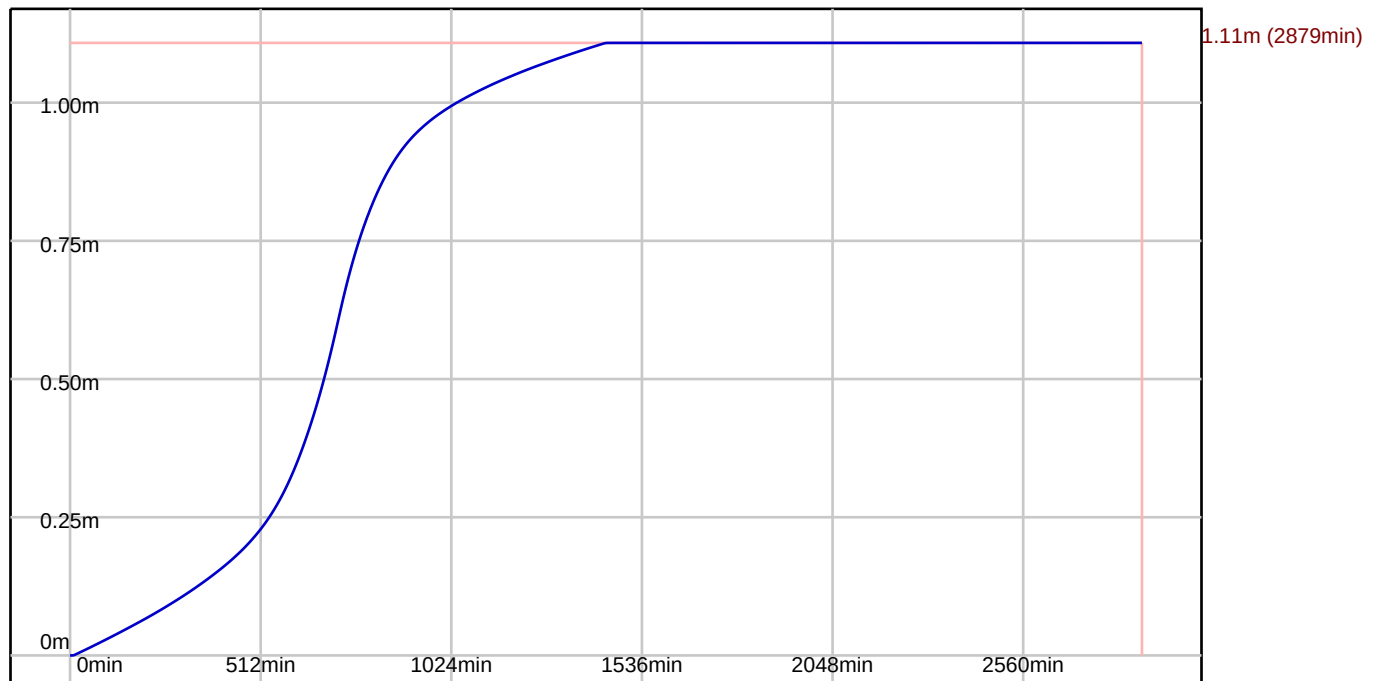
Pond Structure at Manhole S15

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
57.200	1.650	2126.676	58.550	0.300	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S15



Pond at S15 (100Yr+40% 1440Min Summer)



Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_394500_178500_v5_0_1.xml

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (100, +40%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
100Yr+40% 60Min Winter	51.205	0.00	-0.02	100Yr+40% 480Min Summer	11.992	0.00	0.34
100Yr+40% 60Min Summer	51.205	0.00	0.01	100Yr+40% 480Min Winter	11.992	0.00	0.34
100Yr+40% 120Min Winter	31.080	0.00	0.04	100Yr+40% 600Min Summer	10.296	0.00	0.38
100Yr+40% 120Min Summer	31.080	0.00	0.06	100Yr+40% 600Min Winter	10.296	0.00	0.39
100Yr+40% 180Min Winter	23.358	0.00	0.11	100Yr+40% 720Min Summer	9.068	0.00	0.42
100Yr+40% 180Min Summer	23.358	0.00	0.12	100Yr+40% 720Min Winter	9.068	0.00	0.42
100Yr+40% 240Min Winter	19.180	0.00	0.16	100Yr+40% 960Min Summer	7.383	0.00	0.47
100Yr+40% 240Min Summer	19.180	0.00	0.16	100Yr+40% 960Min Winter	7.383	0.00	0.47
100Yr+40% 360Min Winter	14.566	0.00	0.27	100Yr+40% 1440Min Winter	5.431	0.00	0.52
100Yr+40% 360Min Summer	14.566	0.00	0.27	100Yr+40% 1440Min Summer	5.431	0.00	0.51

Simulation Results

Return Period Yrs: 100.0

Climate Change %: 40

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	60 min Summer	32	62.616	0.826	101.758		Surcharged
S2	60 min Summer	32	60.915	0.255	137.797		OK
S3	60 min Summer	33	60.654	0.264	167.942		OK
S4	60 min Summer	32	62.430	1.160	98.299		Flood Risk
S5	60 min Summer	33	61.790	0.980	108.998		Surcharged
S6	60 min Summer	34	60.568	0.548	269.638		Surcharged
S7	60 min Summer	34	60.251	0.791	273.598		Surcharged
S8	60 min Summer	34	59.952	1.002	284.180		Surcharged
S9	60 min Summer	33	59.511	1.361	398.663		Surcharged
S10	60 min Summer	33	59.282	1.412	403.445		Flood Risk
S11	60 min Summer	34	59.057	1.207	0.000		Flood Risk
S12	60 min Summer	33	59.057	1.590	420.964		Surcharged
S13	60 min Summer	33	58.345	1.031	476.055		Surcharged
S14	1440 min Summer	1437	58.314	1.037	3.518		Surcharged
S15	1440 min Summer	1470	58.308	1.108	0.000		OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	60 min Summer	33	S1	S2	0.225	2.427	96.515	1.274	OK
1.001	60 min Summer	32	S2	S3	0.262	2.215	137.438	1.029	OK
1.002	60 min Summer	33	S3	S6	0.320	2.461	173.328	0.585	OK
2.000	60 min Summer	31	S4	S5	0.225	2.435	96.807	1.269	OK
2.001	60 min Summer	32	S5	S6	0.225	2.765	109.926	1.433	OK
1.003	60 min Summer	32	S6	S7	0.375	3.532	281.103	0.799	Surcharged
1.004	60 min Summer	34	S7	S8	0.375	3.419	275.419	0.789	Surcharged
1.005	60 min Summer	35	S8	S9	0.375	3.292	288.372	0.816	Surcharged
1.006	60 min Summer	32	S9	S10	0.450	2.767	397.913	0.942	OK
1.007	60 min Summer	33	S10	S12	0.450	2.525	401.645	0.788	OK
3.000	960 min Winter	601	S11	S12	0.225	0.444	17.260	0.315	OK
1.008	60 min Summer	34	S12	S13	0.450	2.651	421.616	2.272	OK
1.009	60 min Summer	33	S13	S14	0.450	2.993	475.975	2.565	OK
1.010	120 min Summer	73	S14	S15	0.450	2.776	399.418	2.152	OK

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S16	0.000	1.350	Type C	60.189	58.670	1.219	394043.875	178453.447
S17	0.000	1.350	Type C	59.240	58.201	0.814	394066.137	178423.424
S18	0.121	1.350	Type C	59.489	58.086	1.103	394060.406	178431.276
S19	0.000	1.350	Type C	59.757	58.031	1.427	394071.373	178438.807
S20	0.070	1.200	Type B	60.255	57.836	2.119	394108.762	178466.736
S21	0.000	1.200	Type B	59.872	57.738	1.834	394122.586	178485.866
S22	0.000	1.200	Type B	59.486	57.640	1.546	394121.865	178509.399
S23	0.000	1.350	Type C	58.512	57.272	0.941	394079.682	178586.994
S24	0.000	0.000	Type C	58.850	57.200	1.350	394066.768	178598.336

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S16	58.670	S18	58.086	Circ	0.3mØ	27.656	47.4	0.600	1.219	1.103
2.000	S17	58.201	S18	58.161	Circ	0.225mØ	9.721	240.0	0.600	0.814	1.103
1.001	S18	58.086	S19	58.031	Circ	0.3mØ	13.304	240.0	0.600	1.103	1.427
1.002	S19	58.031	S20	57.836	Circ	0.3mØ	46.668	240.0	0.600	1.427	2.119
1.003	S20	57.836	S21	57.738	Circ	0.3mØ	23.602	240.0	0.600	2.119	1.834
1.004	S21	57.738	S22	57.640	Circ	0.3mØ	23.545	240.0	0.600	1.834	1.546
1.005	S22	57.640	S23	57.272	Circ	0.3mØ	88.320	240.0	0.600	1.546	0.941
1.006	S23	57.272	S24	57.200	Circ	0.3mØ	17.188	240.0	0.600	0.941	1.350

Outfall Details

Outfall Manhole S24 : Free Discharge

Flow Control Details

Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_394500_178500_v5_0_1.xml

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (100, +40%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
100Yr+40% 60Min Winter	51.205	0.00	0.00	100Yr+40% 480Min Summer	11.992	0.00	0.00
100Yr+40% 60Min Summer	51.205	0.00	0.00	100Yr+40% 480Min Winter	11.992	0.00	0.00
100Yr+40% 120Min Winter	31.080	0.00	0.00	100Yr+40% 600Min Summer	10.296	0.00	0.00
100Yr+40% 120Min Summer	31.080	0.00	0.00	100Yr+40% 600Min Winter	10.296	0.00	0.00
100Yr+40% 180Min Winter	23.358	0.00	0.00	100Yr+40% 720Min Summer	9.068	0.00	0.00
100Yr+40% 180Min Summer	23.358	0.00	0.00	100Yr+40% 720Min Winter	9.068	0.00	0.00
100Yr+40% 240Min Winter	19.180	0.00	0.00	100Yr+40% 960Min Summer	7.383	0.00	0.00
100Yr+40% 240Min Summer	19.180	0.00	0.00	100Yr+40% 960Min Winter	7.383	0.00	0.00
100Yr+40% 360Min Winter	14.566	0.00	0.00	100Yr+40% 1440Min Winter	5.431	0.00	0.00
100Yr+40% 360Min Summer	14.566	0.00	0.00	100Yr+40% 1440Min Summer	5.431	0.00	0.00

Simulation Results

Return Period Yrs: 100.0

Climate Change %: 40

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S16	-	0	58.670	0.000	0.000		OK
S17	60 min Summer	32	58.294	0.092	0.128		OK
S18	60 min Summer	32	58.294	0.208	55.906		OK
S19	60 min Summer	33	58.267	0.237	51.777		OK
S20	60 min Summer	33	58.189	0.353	81.605		Surcharged
S21	60 min Summer	33	58.067	0.330	82.371		Surcharged
S22	60 min Summer	33	57.945	0.306	82.365		Surcharged
S23	60 min Summer	34	57.520	0.248	81.815		OK
S24	60 min Summer	34	57.423	0.223	81.871		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	60 min Summer	32	S16	S18	0.104	0.000	0.000	0.000	OK
2.000	60 min Summer	35	S17	S18	0.113	0.103	1.083	0.033	OK
1.001	60 min Summer	33	S18	S19	0.222	1.163	57.767	0.810	OK
1.002	60 min Summer	33	S19	S20	0.268	0.908	55.600	0.780	OK
1.003	60 min Summer	32	S20	S21	0.300	1.223	84.621	1.187	Surcharged
1.004	60 min Summer	33	S21	S22	0.300	1.229	83.338	1.169	Surcharged
1.005	60 min Summer	34	S22	S23	0.274	1.228	81.815	1.147	OK
1.006	60 min Summer	34	S23	S24	0.235	1.376	81.871	1.148	OK

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S25	0.158	1.350	Type C	61.317	59.870	1.222	394005.507	178463.013
S26	0.000	1.350	Type C	60.889	59.410	1.254	394028.072	178475.237
S27	0.028	1.350	Type C	60.498	58.950	1.248	394042.538	178493.837
S28	0.181	1.350	Type C	60.276	58.635	1.341	394044.225	178505.611
S29	0.000	1.350	Type C	59.142	57.848	1.069	394011.031	178534.247
S30	0.027	1.200	Type B	59.535	57.746	1.564	394027.781	178531.693
S31	0.010	1.350	Type B	59.880	57.510	1.995	394038.947	178522.611
S32	0.040	1.350	Type B	59.721	57.454	1.892	394050.906	178532.450
S33	0.165	1.350	Type B	59.345	57.306	1.664	394076.998	178568.183
S34	0.165	1.350	Type C	59.115	57.269	1.471	394071.962	178578.276
S35	0.000	0.000	Unknown	58.850	57.200	1.275	394061.371	178595.939

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S25	59.870	S26	59.410	Circ	0.225mØ	25.664	55.8	0.600	1.222	1.254
1.001	S26	59.410	S27	59.025	Circ	0.225mØ	23.563	61.2	0.600	1.254	1.248
1.002	S27	58.950	S28	58.710	Circ	0.3mØ	11.894	49.6	0.600	1.248	1.266
1.003	S28	58.635	S31	57.585	Circ	0.3mØ	17.801	17.0	0.600	1.341	1.995
2.000	S29	57.848	S30	57.746	Circ	0.225mØ	16.943	167.0	0.600	1.069	1.564
2.001	S30	57.746	S31	57.660	Circ	0.225mØ	14.393	167.0	0.600	1.564	1.995
1.004	S31	57.510	S32	57.454	Circ	0.375mØ	15.486	275.2	0.600	1.995	1.892
1.005	S32	57.454	S33	57.306	Circ	0.375mØ	44.246	300.0	0.600	1.892	1.664
1.006	S33	57.306	S34	57.269	Circ	0.375mØ	11.280	300.0	0.600	1.664	1.471
1.007	S34	57.269	S35	57.200	Circ	0.375mØ	20.595	300.0	0.600	1.471	1.275

Outfall Details

Outfall Manhole S35 : Free Discharge

Flow Control Details

Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_394500_178500_v5_0_1.xml

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (100, +40%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
100Yr+40% 60Min Winter	51.205	0.00	-0.01	100Yr+40% 480Min Summer	11.992	0.00	0.00
100Yr+40% 60Min Summer	51.205	0.00	-0.05	100Yr+40% 480Min Winter	11.992	0.00	0.00
100Yr+40% 120Min Winter	31.080	0.00	0.00	100Yr+40% 600Min Summer	10.296	0.00	0.00
100Yr+40% 120Min Summer	31.080	0.00	-0.01	100Yr+40% 600Min Winter	10.296	0.00	0.00
100Yr+40% 180Min Winter	23.358	0.00	0.00	100Yr+40% 720Min Summer	9.068	0.00	0.00
100Yr+40% 180Min Summer	23.358	0.00	0.00	100Yr+40% 720Min Winter	9.068	0.00	0.00
100Yr+40% 240Min Winter	19.180	0.00	0.00	100Yr+40% 960Min Summer	7.383	0.00	0.00
100Yr+40% 240Min Summer	19.180	0.00	0.00	100Yr+40% 960Min Winter	7.383	0.00	0.00
100Yr+40% 360Min Winter	14.566	0.00	0.00	100Yr+40% 1440Min Winter	5.431	0.00	0.00
100Yr+40% 360Min Summer	14.566	0.00	0.00	100Yr+40% 1440Min Summer	5.431	0.00	0.00

Simulation Results

Return Period Yrs: 100.0

Climate Change %: 40

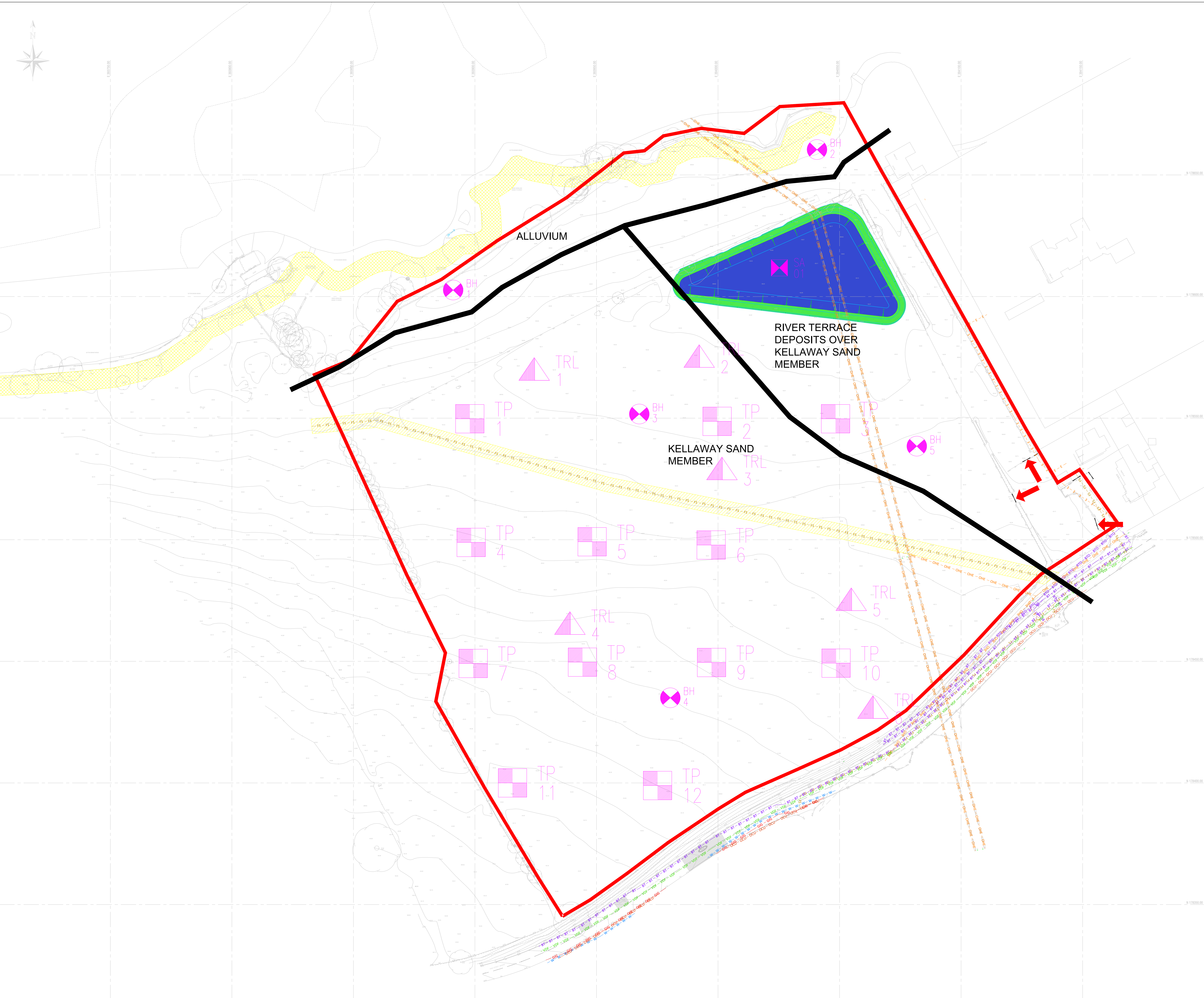
Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S25	60 min Summer	32	60.161	0.291	72.802		Surcharged
S26	60 min Summer	32	59.669	0.259	73.476		Surcharged
S27	60 min Summer	33	59.196	0.246	83.891		OK
S28	60 min Summer	33	59.151	0.516	159.940		Surcharged
S29	60 min Summer	33	58.808	0.960	0.230		Surcharged
S30	60 min Summer	33	58.807	1.061	11.254		Surcharged
S31	60 min Summer	33	58.798	1.288	176.197		Surcharged
S32	60 min Summer	33	58.684	1.230	192.800		Surcharged
S33	60 min Summer	32	58.297	0.991	261.384		Surcharged
S34	60 min Summer	32	58.118	0.849	335.784		Surcharged
S35	60 min Summer	30	57.575	0.375	305.412		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	60 min Summer	31	S25	S26	0.225	2.002	75.181	1.078	OK
1.001	60 min Summer	32	S26	S27	0.218	1.908	72.826	1.095	OK
1.002	60 min Summer	33	S27	S28	0.273	2.278	86.118	0.545	OK
1.003	60 min Summer	31	S28	S31	0.300	2.695	167.791	0.619	Surcharged
2.000	60 min Summer	37	S29	S30	0.225	0.289	8.425	0.210	OK
2.001	60 min Summer	36	S30	S31	0.225	0.686	24.498	0.612	OK
1.004	60 min Summer	34	S31	S32	0.375	1.603	177.022	1.476	Surcharged
1.005	60 min Summer	34	S32	S33	0.375	1.784	197.065	1.717	Surcharged
1.006	60 min Summer	33	S33	S34	0.375	2.389	263.904	2.299	Surcharged
1.007	60 min Summer	32	S34	S35	0.375	3.035	335.222	2.920	Surcharged

Appendix G – Infiltration Testing Location Plan



GENERAL NOTES

- DO NOT SCALE.**
- This drawing is to be read in conjunction with all other relevant drawings and details.
- Should there be an conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed **PRIOR** to construction on site.
- Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the Contractor commence site works prior to such approval being provided it is entirely at their own risk.
- Sketch proposals are for illustrative purposes only and as such are subject to detailed site investigation including ground conditions, contaminants, drainage, design and planning / design negotiations.
- All dimensions are in metres unless otherwise stated.
- The Readers Least Designer's Risk Assessment(s) for this project must be reviewed **PRIOR** to the commencement of any works on site.

EY

- | | |
|--|--|
| | HV Overhead Electricity Cable |
| | WATER — W — W — W — W — W — W — |
| | FOUL SEWER — F — S — F — S — F — S — |
| | BT — BT — BT — BT — BT — BT — |
| | BT OVERHEAD — BT — BT — BT — BT — |
| | ELECTRICITY — E — E — E — E — E — |
| | ELECTRICITY OVERHEAD — OHE — |
| | GAS/CABLE — GG — GG — GG — GG — |
| | VODAFONE — VV — VV — VV — VV — |
| | OCU — OCU — OCU — OCU — OCU — |
| | 8m no activity zone from main river. |
| | Existing Messias Water service easement.
3m either side centreline of pipe. |
| | Proposed Infiltration Basin |
| | Access Gate |
| | Geological Boundary |
| | Window Sample Borehole |
| | Soakaway Test |
| | Initu CBR Test |
| | Trial Pit |

3/10/25	First Issue	AJ	
Date	Amendments	By	Chk

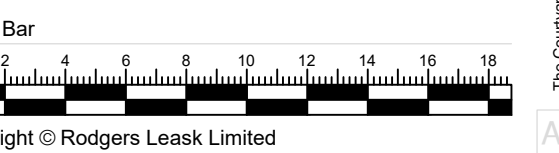


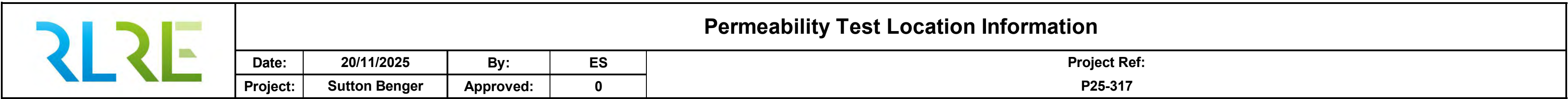
SEASON LAND

ND AT GATE FARM,
GH STREET,
TTON BENDER

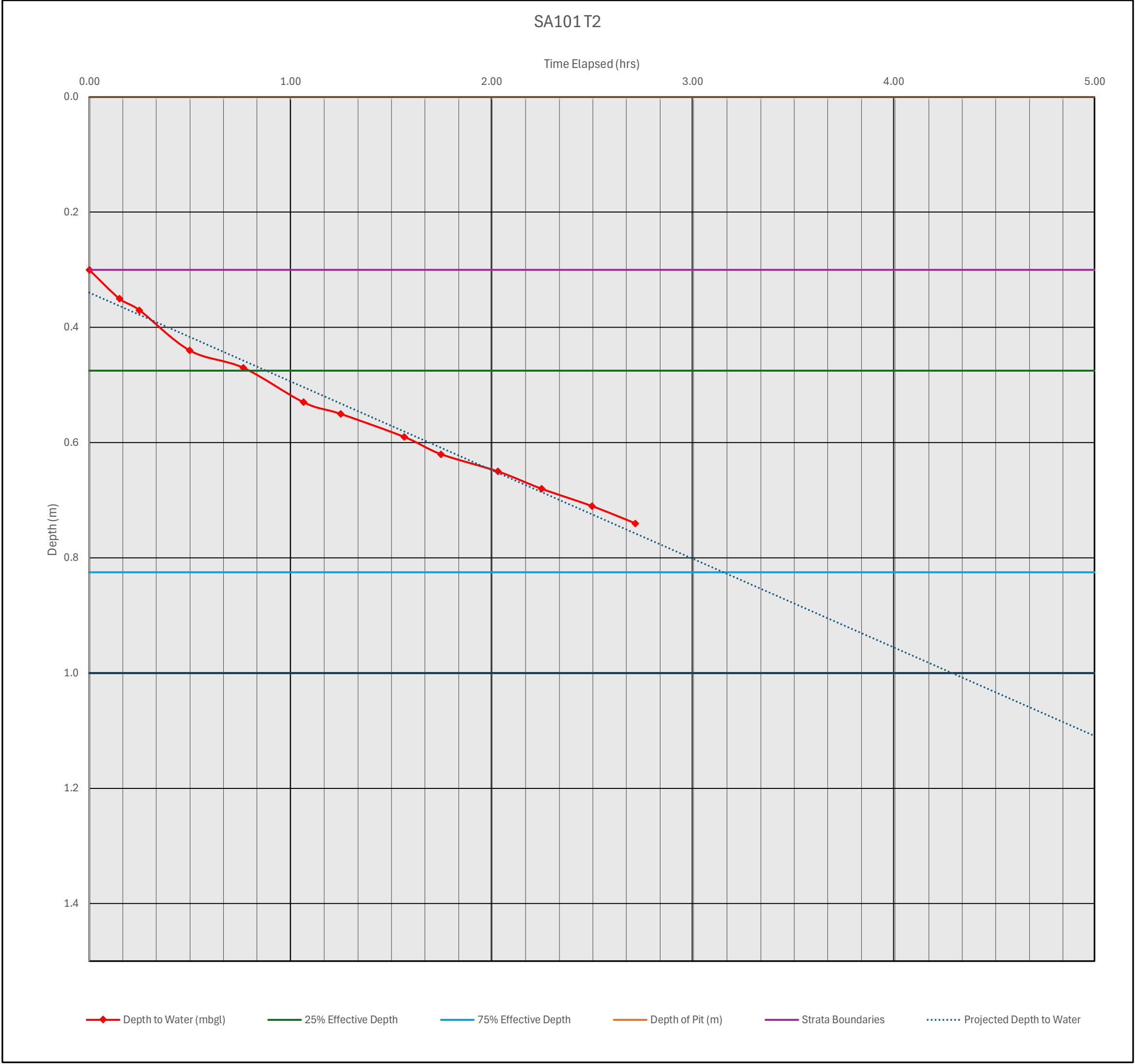
PROPOSED EXPLORATORY FILE PLAN

	Drawn	Checked	Date
0 @ A0	AJ		03/10/25
ing Number			Revision
17-RLL-25-XX-DR-O-0003			P01





Time elapsed to 25% Effective Depth (Mins)	48
Projected Time elapsed to 75% Effective Depth (Mins)	190

[illegible]

$$\text{Soil infiltration rate, } f = \frac{V_{p75-25}}{a_{s50} \times t_{p75-25}}$$

Where:

V_{p75-25} = The effective storage volume of water in trial pit between 75% and 25% effective depth;

a_{s50} = The internal surface area of the trial pit up to 50% effective depth and including the base area;

t_{p75-25} = The time for the water level to fall from 75%-25% depth

t_{p75-25} (Secs)	8520.00	V_{p75-25} (m³)	0.64
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a_{s50} (m²)	4.51	f (m/s)	1.65E-05
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