LISS FOREST NURSERY, GREATHAM, LISS, HAMPSHIRE

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

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1. INTRODUCTION

1.1. This Flood Risk Assessment has been prepared on behalf of the Clients in connection with proposals for a Development of 37 residential dwellings (including affordable homes), alterations to existing access onto Petersfield Road, hard and soft landscaping, drainage and all other associated development works on land at Liss Forest Nursery, Petersfield Road in Greatham, Liss.

1.2. The overall site comprises around 2.4 hectares and is located to the South East of Petersfield Road and to the South West of Bakers Field, which lies in the district of South Downs National Park. The postcode is GU33 6EU, and the approximate grid reference for the site is X: 477680, Y: 130730. The location of the site is shown edged red on Figure 1 below.

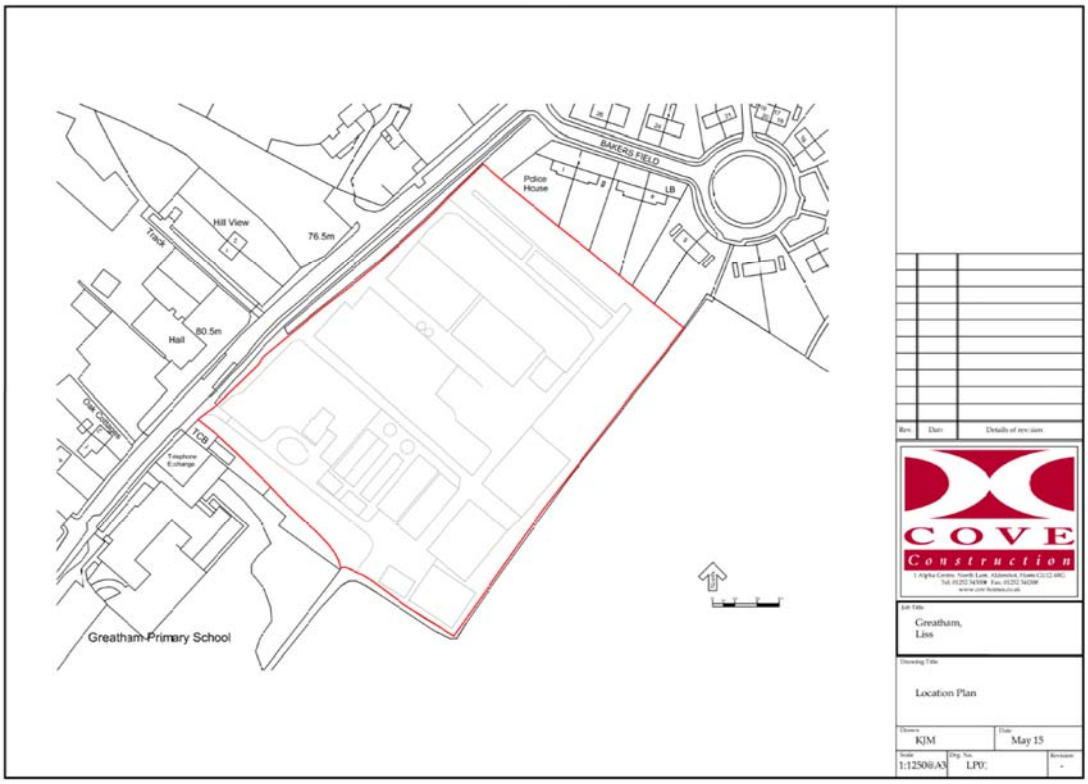


Figure 1: Site Location Plan

1.3. The Site is allocated for development in the South Downs local Plan: Adopted July 2019 as "Allocation Policy SD71: Land at Petersfield Road, Greatham".

1.4. The main purpose of this site-specific Flood Risk Assessment is to provide sufficient flood risk information to support a planning application for the development proposals in order to demonstrate that the development would be appropriately safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, would reduce flood risk overall.

2. SCOPE OF THE ASSESSMENT

2.1. The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied. It was published in February 2019 and replaces the first Framework published in March 2012, and includes minor clarifications to the revised version published in July 2018.

2.2. Policy on planning and flood risk in the NPPF is dealt with at paragraphs 155-165 in chapter 14 'Meeting the challenge of climate change, flooding and coastal change'.

2.3. The national planning practice guidance to the NPPF was launched as a web-based resource in March 2014. The category dealing with flooding is contained in Flood Risk and Coastal Change (Reference ID: 7 Updated: 16 11 2016).

2.4. Paragraph 155 of the NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.

2.5. Paragraph 156 states that strategic policies should be informed by a strategic flood risk assessment (SFRA), and should manage flood risk from all sources.

2.6. A Level 1 SFRA was prepared by Amec Foster Wheeler on behalf of South Downs National Park Authority, in April 2015. As a result of changes to the sites within the Strategic Housing Land Availability Assessment, the proposed housing allocations in the emerging Local Plan were revised. An update to the Level 1 SFRA and a more detailed Level 2 SFRA were published in September 2017 to take account of these changes. The SFRAs provide an overview of flood risk from all sources including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

2.7. As set out in paragraph 157 of the NPPF, all plans should apply a sequential, risk-based approach to the location of development - taking into account the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property.

2.8. Paragraph 158 states that the aim of the sequential test is to steer new development to areas with the lowest probability of flooding, and the strategic flood risk assessment will provide the basis for applying the test.

2.9. Paragraph 19 in the Flood Risk and Coastal Change Planning Practice Guidance[1] states that the flood zones, as refined in the SFRA for the area, provide the basis for applying the sequential test.

2.10. A copy of the Environment Agency's Flood Map for Planning, obtained from the GOV.UK website, which shows the Flood Zones in the vicinity of the site, is reproduced as **Figure 2** below.

[1] Planning Practice Guidance reference ID: 7-019-20140306

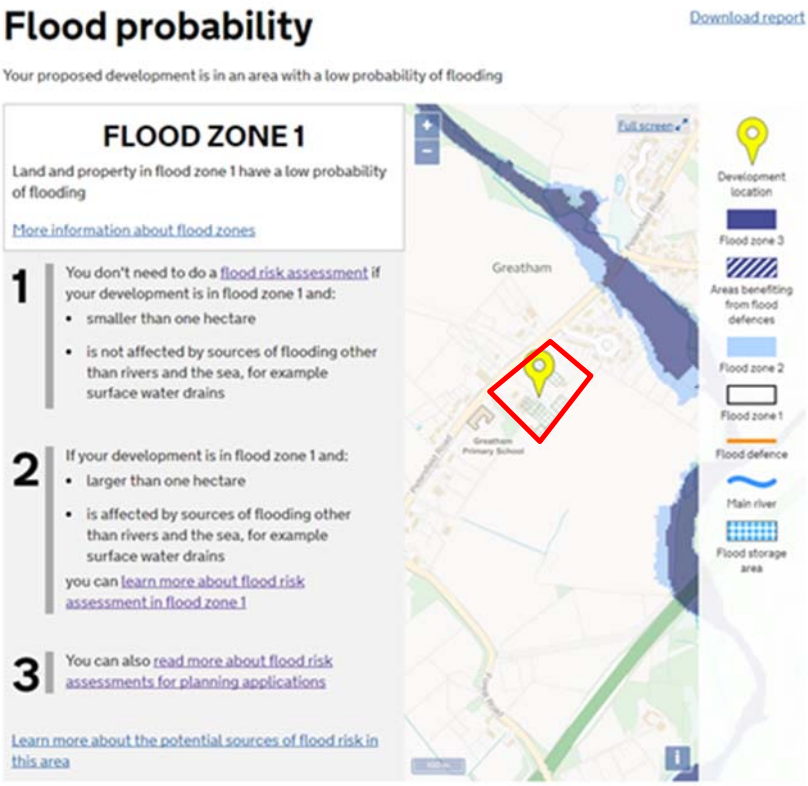


Figure 2: EA Flood Map for Planning

2.11. The Environment Agency's Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences, and show the extent of the natural floodplain and the additional extent of an extreme flood. The Environment Agency's Flood Map for Planning shows the area that could be affected by flooding, either from rivers or the sea, coloured dark blue corresponding to Flood Zone 3. The light blue area is Flood Zone 2 and shows the additional extent of an extreme flood from rivers or the sea. These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Where there is no blue shading, this shows the area where flooding from rivers and the sea is very unlikely corresponding to Flood Zone 1.

2.12. The red line site boundary has been added to the Environment Agency's Flood Map for Planning as shown in Figure 2. From an inspection of the Flood Map, it can be seen that the site falls entirely within Flood Zone 1.

2.13. As set out in paragraph 163 of the NPPF, when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood risk assessment.

2.14. Footnote 50 in the NPPF states that 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.

Flood Risk Assessment Guidance

2.15. Paragraph 30 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-030-20140306) advises that a site-specific flood risk assessment is carried out to assess the flood risk to and from a development site. The assessment should demonstrate 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.

2.16. For the purposes of applying the NPPF, paragraph 2 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-002-20140306) advises that "flood risk" is a combination of the probability and the potential consequences of flooding from all sources - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

2.17. Paragraph 31 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-031-20140306) advises that the information provided in the flood risk assessment should be credible and fit for purpose. Site-specific flood risk assessments should always be proportionate to the degree of flood risk and make optimum use of information already available, including information in a SFRA for the area, and the interactive flood risk maps. A flood risk assessment should also be appropriate to the scale, nature and location of development.

2.18. Paragraph 68 of the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-068-20161116) provides a model checklist for a site specific flood risk assessment.

2.19. With regard to what further advice is available on the preparation of a site-specific flood risk assessment, paragraph 32 of the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-032-20150415) refers to the Environment Agency Standing Advice on flood risk.

2.20. Guidance from the Environment Agency and Department for Environment, Food & Rural Affairs (DEFRA), on the Government's GOV.UK website includes guidance on how to carry out a flood risk assessment entitled: 'Flood risk assessment in flood zone 1 and critical drainage areas'. This guidance provides information on the range of factors that need to be considered when assessing flood risk. A copy of this guidance is reproduced in **Appendix 1**.

2.21. Reference has also been made to: BS 8533:2017 'Assessing and managing flood risk in development - Code of practice'; BS 8582:2013 'Code of practice for surface water management for development sites'; and the Local Authority SuDS Officer Organisation (LASOO) document entitled 'Non-Statutory Technical Standards for Sustainable Drainage: Practice Guidance'.

2.22. The DEFRA/EA guidance 'Review individual flood risk assessments: standing advice for local planning authorities' sets out when local planning authorities must consult the Environment Agency, their lead local flood authority or both, on any proposed developments at a higher risk from flooding before making a decision.

2.23. In this context 'major development' is defined in the NPPF Annex 2: Glossary as follows: For housing, development where 10 or more homes will be provided, or the site has an area of 0.5 hectares or more.

2.24. For 'major development' with surface water drainage in Flood Zone 1 the local planning authority needs to consult their lead local flood authority, and if the development is in an area with critical drainage problems, they also need to consult the Environment Agency.

2.25. Local planning authorities also need to consult the Environment Agency if the development is within 20m of a main river in Flood Zones 1, 2 or 3.

2.26. The proposed development is classed as 'major development' as it is for more than 10 dwellings. The local planning authority, therefore, needs to consult their lead local flood authority. However, it is not in an area with critical drainage problems and is not within 20m of a main river, so they do not need to consult the Environment Agency.

Local Plan Policies

2.27. The South Downs Local Plan: Adopted July 2019 provides a planning policy framework for the period up to 2033.

2.28. Relevant policies from the Adopted Local Plan include Strategic Policies SD17 and SD49.

2.29. Strategic Policy SD49: Flood Risk Management states:

"Development proposals will be permitted that seek to reduce the impact and extent of all types of flooding through:

a. *Steering development away from areas of flood risk as identified by the Environment Agency and the Strategic Flood Risk Assessment. Development in areas of flood risk will, where relevant, be required to meet the national Sequential and Exception tests;*
b. *Not increasing the risk of flooding elsewhere and, wherever possible, reducing overall flood risk;*
c. *Flood protection, mitigation and adaptation measures necessary and appropriate to the specific requirements of the proposal, the development site and other areas potentially impacted; and*
d. *Ensuring that the integrity of coastal and river flood defences are not undermined."*

Summary of Scope

2.30. The scope of this Flood Risk Assessment is to provide sufficient information to satisfy the requirements of the NPPF, the planning practice guidance checklist, Local Plan Policies, guidance published by DEFRA/Environment Agency and the Government's 'Non-statutory technical standards for sustainable drainage systems'.

3. FLOOD RISK ASSESSMENT

Development Site and Location

3.1. The site is located to the south-east of Petersfield Road and south west of Bakers Field in Greatham, near Liss in the district of East Hampshire. The postcode is GU33 6HA, and the approximate grid reference for the site is X: 477675, Y: 130729.

3.2. The Site Location Plan and the Environment Agency's Flood Map for Planning are based on the Ordnance Survey map of the area, and show geographical features and identify watercourses and other bodies of water in the vicinity of the site.

3.3. The site is currently in use as a horticultural nursery and also includes a residential bungalow.

3.4. The nearest watercourse is an ordinary watercourse, located approximately 200m to the east of the site. The ordinary watercourse flows to the south before forming a confluence with the River Rother approximately 1km to the south of the site.

Development Proposals

3.5. The Development of 37 dwellings (including affordable homes), alterations to existing access onto Petersfield Road, hard and soft landscaping, drainage and all other associated development works and with associated infrastructure on land at Liss Forest Nursery, Petersfield Road in Greatham, Liss.

3.6. A copy of the Site Layout (37 Units) Planning Layout, Drawing Number 150715/SL37/01 Revision Z6, prepared by Carlton design partnership, showing the development proposals, is reproduced in **Appendix 2**.

Site Levels

3.7. A Topographical Survey was undertaken by Encompass Surveys in August 2017. A copy of Drawing Number ENC/070817/5Z3-Topo is reproduced in **Appendix 3.**

3.8. The Topographical Survey indicates that the site falls downhill from north-west to south-east, from around 82.8m AOD in the north-west of the site, to around 77.1m AOD in the east of the site.

Flood Risk Vulnerability and Flood Zone 'Compatibility'

3.9. Paragraphs 65-67 of the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-065-20140306) refer to 3 Flood Zone and Flood Risk Tables.

3.10. Table 1: Flood Zones provides a definition of each Flood Zone. Table 2: Flood Risk Vulnerability Classification categorises different types of development according to their vulnerability to flood risk. Table 3: Flood risk vulnerability and flood zone 'compatibility' maps these vulnerability classes against the flood zones to indicate where development is appropriate and where development should not be permitted.

3.11. The Environment Agency's Flood Map for Planning indicates that the site falls within Flood Zone 1.

3.12. With reference to Table 2, the proposed residential development falls into the 'More Vulnerable' flood risk vulnerability classification, which includes buildings used for dwelling houses.

3.13. With reference to Table 3, all uses of land are appropriate in Flood Zone 1.

Probability

3.14. A definition of each Flood Zone and probability of river or sea flooding is provided in Table 1 at paragraph 65 of the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-065-20140306). Flood Zone 1 Low Probability is defined as land having a less than a 1 in 1000 (0.1%) annual probability of river or sea flooding.

The Sequential Test and Exception Test

3.15. Paragraph 157 of the NPPF states:

> **'All plans should apply a sequential, risk-based approach to the location of development - taking into account the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property.'**

3.16. Paragraph 158 of the NPPF goes onto state:

> **'The aim of the sequential test is to steer new development to areas with the lowest probability of flooding. 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 the test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.'**

3.17. Paragraph 159 of the NPPF states:

> **'If it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in national planning guidance.'**

3.18. Paragraph 160 of the NPPF states:

> **'The application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. For the exception test to be passed it should be demonstrated that*:***
>
> **a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and**
>
> **b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.'**

3.19. Paragraph 161 of the NPPF goes onto state:

> **'Both elements of the exception test should be satisfied for development to be allocated or permitted.'**

3.20. Paragraph 162 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 plan-making stage, or if more recent information about existing or potential flood risk should be taken into account.'

3.21. Paragraph 163 of the NPPF states:

'When determining any planning applications, local planning authorities should ensure flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient,

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.'

3.22. The Notes to Table 3 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-067-20140306) indicate that the application of the sequential test should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3.

3.23. The site falls within Flood Zone 1 and on this basis the sequential test is passed.

Climate Change

3.24. The NPPF requires development to take account of the impacts of climate change. The allowances to be made for climate change effects when assessing flood risk are related to the lifetime of the development.

3.25. Guidance on the lifetime of development is provided at paragraph 26 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-026-20140306). Residential development should be considered for a minimum of 100 years, unless there is specific justification for considering a shorter period.

3.26. Under heading 4 in the Site-Specific Flood Risk Assessment Checklist in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-068-20161116), it asks how is flood risk at the site likely to be affected by climate change and states that further advice on how to take account of climate change in flood risk assessments is available from the Environment Agency. Guidance published by the Environment Agency on 19 February 2016, and last updated on 22 July 2020, entitled 'Flood risk assessments: climate change allowances', sets out the climate change allowances to be used for peak river flow by river basin district, peak rainfall intensity, sea level rise, offshore wind speed and extreme wave height.

3.27. Table 1 of 'Flood risk assessments: climate change allowances' gives the peak river flow allowances by river basin district for 3 categories: central, higher central and upper end, and 3

time frames. The appropriate allowance to use depends on the flood zone and the flood risk vulnerability classification of the development.

3.28. The site lies in the South East river basin district, and the proposed change of use falls into the 'More Vulnerable' flood risk vulnerability classification. Based on the flood zone and flood risk vulnerability classification of the development, the higher central and upper-end allowances need to be used to assess the range of impact. The total potential change anticipated for 2070 to 2115 is given as 35% for the higher central category and 70% for the upper-end category. The previous normal climate change allowance used for peak river flows was 20%.

3.29. The peak rainfall intensity allowances to be used when designing urban drainage systems are given in Table 2 of 'Flood risk assessments: climate change allowances'. Both the central and upper-end allowances need to be assessed to understand the range of impact. The total potential change anticipated for 2060 to 2115 is 20% for the central category, and 40% for the upper-end category.

Standard of Protection

3.30. In terms of providing an acceptable standard of protection against flooding for new development, paragraph 54 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-054-20150415) advises how development can be made safe from flood risk. Reference is made to the ability of residents and users to safely access and exit a building during a design flood. Paragraph 55 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-055-20140306) defines a "design flood" as follows:

'This is a flood event of a given annual probability, which is generally taken as:

- **fluvial (river) flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year) or ;**
- **tidal flooding with a 0.5 per cent annual probability (1 in 200 chance each year),**

against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.'

3.31. Therefore, in terms of providing an acceptable standard of protection against flooding for new development, no flooding of property should occur as a result of the 'design flood' corresponding to a 1 in 100-year fluvial flood event, or a 1 in 200-year tidal flood event, taking account of climate change.

3.32. The Government published its 'Non-statutory technical standards for sustainable drainage systems' in March 2015. They should be used in conjunction with the NPPF and planning practice guidance. Standard S7 states that the drainage system must be designed so that flooding does not occur on any part of the site for a 1 in 30-year rainfall event. Standard S8 goes on to state that the drainage system must be designed so that flooding does not occur during a 1 in 100-year rainfall event in any part of a building (including a basement); or in any utility plant susceptible to water within the development.

Site Specific Flood Risk

3.33. In addition to flooding from rivers, it is also necessary to consider the potential consequences of flooding from all other sources, which include directly from rainfall on the ground surface and

rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

3.34. The Government's GOV.UK website contains 'Long Term Flood Risk Information' which includes interactive maps showing 'Flood risk from rivers or the sea' and 'Flood risk from surface water'. These maps show the chance of flooding in one of four risk categories - High: greater than 1 in 30 (3.3%), Medium: between 1 in 100 (1%) and 1 in 30 (3.3%), Low: between 1 in 1000 (0.1%) and 1 in 100 (1%), and Very Low: less than 1 in 1000 (0.1%). The 'Flood risk from surface water' map indicates the extent, depth and velocity of water for High, Medium and Low risk scenarios. The Long Term Flood Risk Information also includes a 'Flood risk from reservoirs' map, which includes flood depth and flood speed.

3.35. The GOV.UK website advises that when planning a development the detailed flood risk from rivers or the sea information is not suitable for land-use planning, and the Environment Agency's Flood Map for Planning must be used for this purpose.

Flooding from Watercourses

3.36. The nearest watercourse is an ordinary watercourse, located approximately 200m to the east of the site. The ordinary watercourse flows to the south before forming a confluence with the River Rother approximately 1km to the south of the site.

Flooding from Surface Water

3.37. The GOV.UK's Flood risk from surface water map indicates where surface water may be expected to flood or pond. Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. The GOV.UK website advises that flooding from surface water is difficult to predict as rainfall location and volumes are difficult to forecast. The information shows the approximate areas that would flood, and which parts would be shallower or deeper. A copy of the GOV.UK Flood risk from surface water map is reproduced in **Figure 3** below.

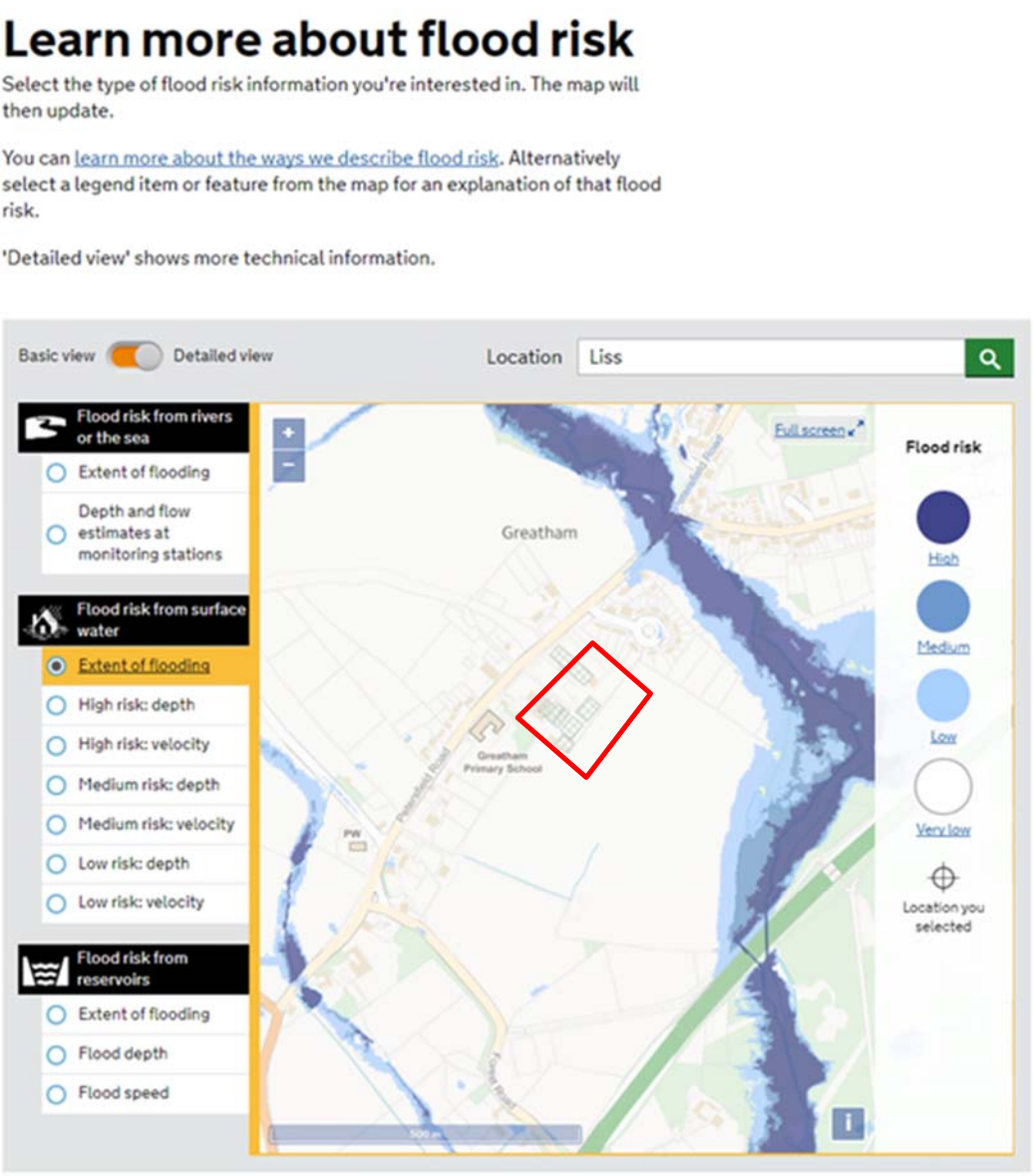


Figure 3: Flood risk from surface water map

3.38. The GOV.UK Flood risk from surface water map shows the site lies in an area with a Very Low: less than 1 in 1000 (0.1%) chance of surface water flooding.

3.39. The required standard of protection against flooding for the development is that no flooding of property should occur as a result of a 1 in 100-year flood event, which corresponds to the Medium risk scenario on the GOV.UK's 'Long Term Flood Risk Information' maps.

Flooding from Groundwater

3.40. Groundwater flooding is most likely to occur in low-lying areas underlain by water-bearing permeable rocks such as sands, gravels, limestone and chalk. Groundwater flooding occurs as a result of water rising from the underlying rocks or from water flowing from abnormal springs. This tends to occur after long periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. In low-lying areas

the water table is usually at shallower depths, so during very wet periods, all the additional groundwater flowing towards these areas can cause the water table to rise to the surface causing groundwater flooding.

3.41. In relation to groundwater flooding, the SFRA states that groundwater flooding on the site is "unlikely".

Flooding from Overwhelmed Sewers and Drainage Systems

3.42. Flooding from sewers and drainage systems occurs when the sewer or drainage system is overwhelmed as a result of a blockage or excessive flow exceeding its capacity. Enquiries have been made to South East Water to establish the location of the existing public sewers in the vicinity of the site.

3.43. Southern water's Sewer Map shows existing public foul water sewer in Petersfield Road. There are no Surface water Sewers in the vicinity of the Site.

3.44. The SFRA does not identify any incident of sewer flooding affecting the site.

Flooding from Artificial Sources

3.45. The GOV.UK's Flood risk from reservoirs map indicates the site is unaffected by flooding from any reservoirs. A copy of the Flood risk from reservoirs map is reproduced in Figure 4 below.

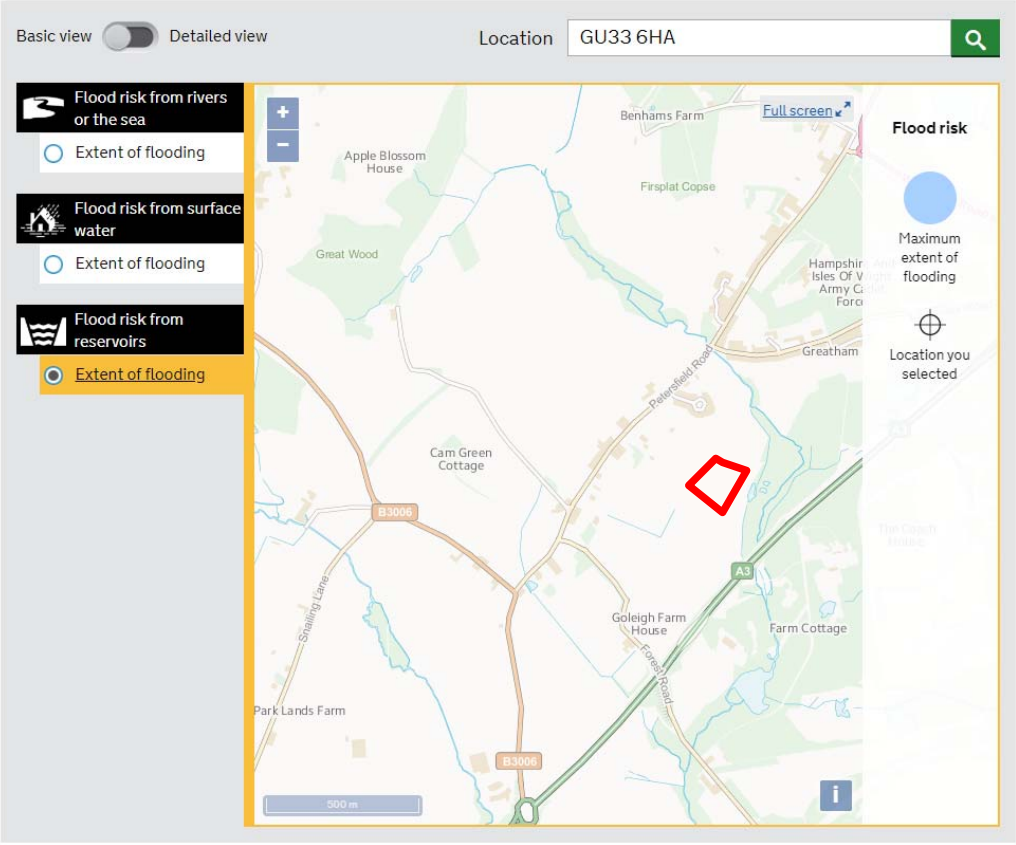


Figure 4: Flood Risk from Reservoirs Map

Summary of Flood Risk

3.46. A summary of the potential risk from all sources of flooding associated with existing conditions pre-development is shown in Table A below.

Table A: Pre-development Potential Flood Risk from All Sources of Flooding

Flood Source	Potential Risk				Description
	Very Low	Low	Medium	High	
Watercourses	X				The site is located in Flood Zone 1.
Surface Water	X				The topography of the land indicates that any overland flow would be directed from west to east on the site towards a ditch which drains into an existing piped system that outfalls into the nearby brook.
Groundwater	X				The SFRA does not identify any groundwater flooding affecting the site and the underlying geology suggests the risk of groundwater flooding is very low.
Overwhelmed Sewers	X				There is no existing off-site sewer network near the site. The SFRA does not identify any incident of sewer flooding affecting the site.
Artificial Sources	X				The site is not affected

3.47. The SFRA, and historic flood information provided by the Environment Agency provides an assessment of the impact of all other sources of potential flooding. Based on the SFRA and information provided by the Environment Agency there are no historic flood incidents recorded on the site from all sources of potential flooding.

3.48. The pre-development potential flood risk to the site from all sources of flooding is considered to be Very Low.

4. DRAINAGE STRATEGY

Sustainable Drainage Systems

4.1. Government policy set out in paragraph 163 of the NPPF states that development should only be allowed in areas at risk of flooding where it can be demonstrated that it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate.

4.2. Paragraph 165 of the NPPF states:

> **'Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:**
>
> **a) take account of advice from the lead local flood authority;**
>
> **b) have appropriate proposed minimum operational standards;**
>
> **c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and**
>
> **d) where possible, provide multifunctional benefits.'**

4.3. 'Major development' is defined in the NPPF Annex 2: Glossary as:

> **'For housing, development where 10 or more homes will be provided, or the site has an area of 0.5 hectares or more. For non-residential development it means additional floorspace of 1,000m2 or more, or a site of 1 hectare or more, or as otherwise provided in the Town and Country Planning (Development Management procedure) (England) Order 2015.'**

4.4. Paragraph 51 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-051-20150323) advises that sustainable drainage systems are designed to control surface water runoff close to where it falls and mimic natural drainage as closely as possible. Sustainable drainage systems provide opportunities to:

- reduce the causes and impacts of flooding;
- remove pollutants from urban runoff at source;
- combine water management with green space with benefits for amenity, recreation and wildlife.

4.5. In terms of what sort of sustainable drainage system should be considered, paragraph 80 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-080-20150323) advises that, generally, the aim should be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable:

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

4.6. The Government published its 'Non-statutory technical standards for sustainable drainage systems' in March 2015. The technical standards relate to the design, construction, operation and maintenance of sustainable drainage systems and have been published as guidance. The Government expect these standards to apply to all developments of 10 homes or more and to major commercial development.

4.7. Paragraph 81 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-081-20150323) states that in considering a development that includes a sustainable drainage system the local planning authority will want to be satisfied that the proposed minimum standards of operation are appropriate. Paragraph 82 (Reference ID: 7-082-20150323) advises that the decision on whether a sustainable drainage system would be inappropriate is a matter of judgement for the local planning authority, taking advice from the relevant flood risk management bodies, including on what sort of sustainable drainage system they would consider to be 'reasonably practicable'. Paragraph 82 states that the judgement of what is reasonably practicable should be by reference to the technical standards and take into account design and construction costs.

4.8. Paragraph 83 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-083-20150323) advises that in terms of the overall viability of a proposed development, expecting compliance with the technical standards is unlikely to be reasonably practicable if more expensive than complying with building regulations provided that where there is a risk of flooding the development will be safe and flood risk is not increased elsewhere.

4.9. The Government's 'Non-statutory technical standards for sustainable drainage systems' set out peak flow control standards (S2 and S3) and volume control technical standards (S4, S5 and S6). For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1-year rainfall event and the 1 in 100-year rainfall event should never exceed the peak greenfield runoff rate for the same event. For developments which were previously developed, the corresponding runoff rate for these events must be as close as reasonably practicable to the greenfield runoff rate from the development, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

4.10. In terms of volume control, where reasonably practicable, for greenfield development, the runoff volume in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event. Where reasonably practicable, for developments which have been previously developed this runoff volume must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume, but should never exceed the runoff volume prior to redevelopment for that event. Where it is not reasonably practicable to constrain the volume of runoff as described it must be discharged at a rate that does not adversely affect flood risk.

4.11. Guidance on the design and construction of SuDS is provided in the 'Interim Code of Practice for Sustainable Drainage Systems', published by the National SUDS Working Group in July 2004, in other CIRIA documents including The SuDS Manual 2015 (CIRIA C753), in the Environment Agency's document entitled 'Sustainable Drainage Systems (SUDS) An introduction', as well as in the Design and Construction Guidance (DCG) published by Water UK.

4.12. There are a number of potential SuDS techniques that might be used on any particular site. These include rainwater harvesting systems, pervious pavements, infiltration devices such as soakaways and infiltration trenches, bioretention systems, as well as flow balancing methods including swales, ponds/detention basins, and underground storage facilities.

4.13. Approved Document H of the Building Regulations states at Section 3.2 that surface water drainage should discharge to a soakaway or other infiltration system where practicable; discharge to a watercourse may require consent from the Environment Agency; and where other forms of outlet are not practicable, discharge should be made to a sewer.

4.14. The use of soakaways, pervious pavements and infiltration devices to discharge surface water runoff to ground depends upon the underlying strata having a suitable permeability. In addition, the Environment Agency will seek to control discharges into underground strata from areas subject to contamination or where groundwater is judged to be at risk from pollution caused by possible contamination.

4.15. The SuDS Manual 2015, and CIRIA C687 'Planning for SuDs - making it happen', promote the use of a SuDS 'management train', which seeks to address the quality and quantity of runoff at all stages of a drainage system. It uses a hierarchy of techniques, namely: i) prevention, ii) source control, iii) site control and iv) regional control. The drainage strategy for the proposed development seeks to follow the concept of a SuDS management train.

4.16. The SFRA states that the site's "SuDS suitability" is "High"

Ground Conditions

4.17. The British Geological Survey (BGS) geological mapping of the area shows the majority of the site is underlain by the Folkestone Formation – Sandstone.

4.18. Based on the Flood Studies Report Winter Rainfall Acceptance Potential (WRAP) Map, as shown reproduced on Drawing Number C795/01 in **Appendix 4**, the site is located in a 'Soil Index Class 4' area. Soil Index Class 4 has the lowest winter rainfall acceptance potential and highest standard percentage runoff, and so suggests the underlying soil has low permeability.

4.19. The Cranfield Soil and AgriFood Institute (CSAI), incorporating the National Soil Resources Institute (NSRI,) at Cranfield University maintains soil reports and maps for England and Wales. The Soilscapes dataset map indicates that soils in the area are 'Freely draining slightly acid loamy soils.

4.20. A site investigation was undertaken by Leap Environmental Ltd. in October 2017. As part of the site investigation, soakage tests were carried out in four locations across the site in accordance with BRE Digest 365. Tests in three of the four locations failed, with only the test at WS8 registering a result. The site investigation containing the soakage tests is reproduced in **Appendix 5**. The site investigation report includes Borehole Logs from across the site. Clay was encountered in all of the Boreholes recorded.

4.21. Based on the foregoing it is considered that the use of soakaways would not provide a suitable means of draining surface water.

Groundwater Source Protection

4.22. From an inspection of the Environment Agency's Aquifer Designation Map dataset held on Natural England's MAGIC website, the site is underlain by a 'principal aquifer'. A copy of the Aquifer Designation Map dataset information is reproduced in Figure 5 below.

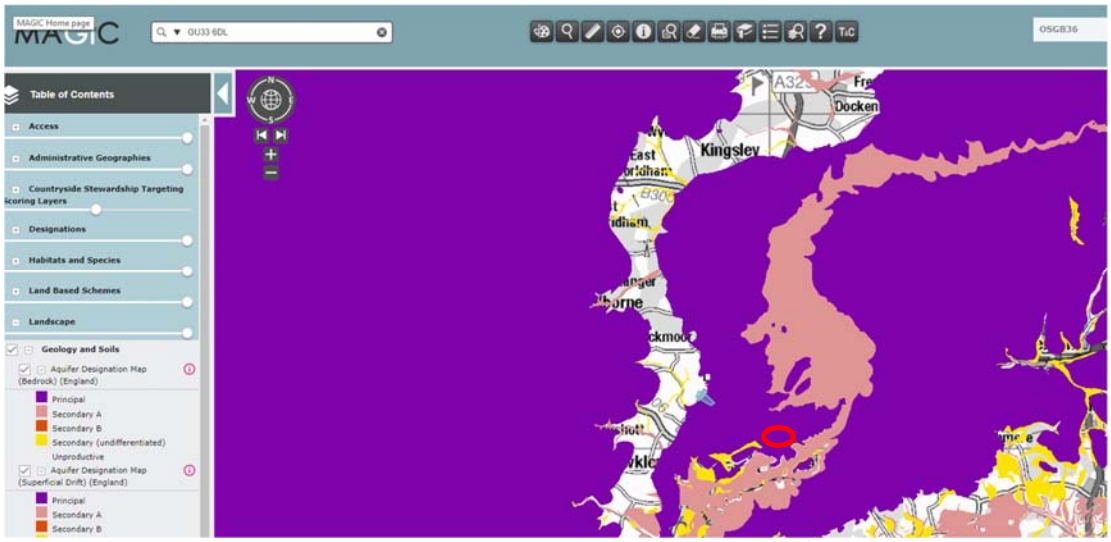


Figure 5: Aquifer Designation Map

4.23. From an inspection of the Environment Agency's Groundwater Source Protection Zone Map the majority of the site falls into Groundwater Zone Source Protection Zone 3, corresponding to the 'total catchment'. A copy of the Environment Agency's Groundwater Source Protection Zone Map is reproduced in **Figure 6** below.

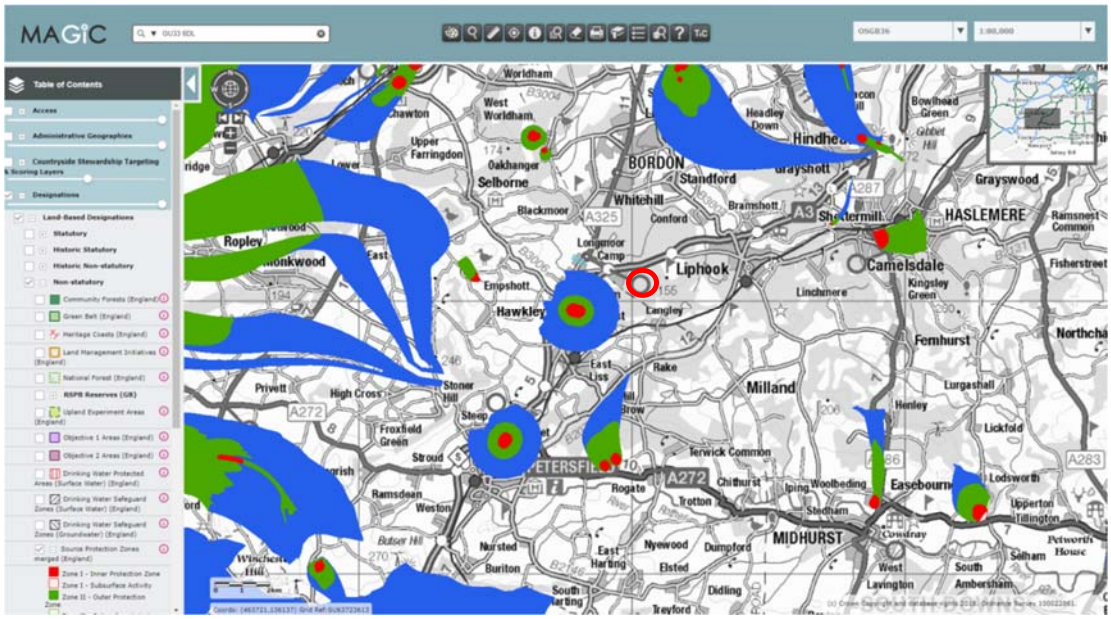


Figure 6: Source Protection Zones

4.24. With reference to the Environment Agency's 'Groundwater protection: policy and practice', the discharge of clean roof water to ground is acceptable both inside and outside SPZ1('inner zone') provided that all roof water down-pipes are sealed against pollutants entering the system from surface run-off, effluent disposal or other forms of discharge.

Surface Water Management

4.25. A sustainable drainage strategy, involving the implementation of SuDS, is proposed for managing the disposal of surface water runoff from the proposed development on the site.

4.26. A preliminary surface water drainage strategy is shown on the Indicative Surface Water Drainage Strategy plan, Drawing No. C795/2, a copy of which is contained in **Appendix 6**.

4.27. As the use of infiltration devices is not feasible it is proposed that surface water drainage is managed by flow balancing methods, to attenuate and store surface water runoff. The preliminary surface water drainage strategy shown on Drawing No. C795/2 comprises a network of surface water sewers and swales, with further attenuation storage provided in a grassed detention basin and pervious paving; Garastor flow controls are utilised to manage flows into the system from the pervious paving, with a Hydro-Brake flow control to manage the discharge from the system into the off-site watercourse.

4.28. The proposed drainage strategy would ensure that surface water arising from the developed site would be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

4.29. In terms of the SuDS 'management train', the drainage strategy for the proposed development seeks to address the quality and quantity of runoff as follows:-

i) Prevention

4.30. Prevention is the use of good site design and housekeeping measures to prevent pollution. Good site design includes the provision of trapped gullies to retain sediment, and suitably designed rain gardens, swales, pervious paving and a grassed detention basin contribute to the pollutant and sediment removal capability of the management train. The housekeeping measures cover maintenance of the drainage system, including the detention basin, swales, rain gardens, pervious paving and general site maintenance.

ii) Source Control

4.31. Source control is defined in The SuDS Manual 2015 (Ciria C753) as the control of runoff at or near its source, so that it does not enter the drainage system or is delayed and attenuated before it enters the drainage system. Source control measures such as detention areas, are priority features of SuDS networks serving urbanised networks and highways. Planting within these areas encourages evapotranspiration.

iii) Site Control

4.32. Site control is the management of water from several sub-catchments within a site. The proposed surface water drainage system amalgamates the runoff from the roofs, roads, and paved areas, for each area of development on the site, and deals with it in a combination of swales, rain gardens, pervious paving, a detention basin and large diameter pipes to attenuate flows and reduce the rate of runoff from the site.

4.33. The detention basin, swales, rain gardens and pervious paving would provide attenuation, and would also contribute to the pollutant and sediment removal capability of the SuDS management train, as well as enhance the site's amenity value and provide biodiversity betterment.

4.34. The detention basin could incorporate a sediment forebay, designed in accordance with the guidance given in The SuDS manual, to enhance water quality.

iv) Regional Control

4.35. Regional control is the management of runoff from more than one site and so, in this case, is covered by the site control techniques.

Greenfield Runoff

4.36. The 'Interim Code of Practice for Sustainable Drainage Systems' states that further information on the calculation of greenfield runoff can be found in DEFRA/Environment Agency R&D Technical Report W5-074/A 'Preliminary rainfall runoff management for developments'.

4.37. Table 1 in the 'Rainfall Runoff Management for Developments – Interim National Procedure Principles' set out in Report – SC030219 sets out that for developments greater than 50 hectares IH Report 124 (Institute of Hydrology Report 124) or the FEH (Flood Estimation Handbook) Q_{MED} equation from the statistical method can be used to calculate the greenfield site peak flow rates. FSSR 2 and 14 regional growth curve factors can be used to calculate the greenfield peak flow rates for other return periods. Where the site is hydrologically similar to the catchment in which it lies, additional FEH techniques can be used to predict flow peaks. Catchment-scale flow predictions will then need to be scaled appropriately to the site area.

4.38. Table 1 in the 'Rainfall Runoff Management for Developments – Interim National Procedure Principles' set out in Report – SC030219 states that for developments between 0-50 hectares one of two approaches can be used:

> **'1. The Institute of Hydrology (IH) Report 124 Flood Estimation for Small Catchments (1994) method can be used to estimate the greenfield site flow rate, QBAR (the Mean Annual Flood).**
>
> **2. The Index Flood, QMED (the median of the set of annual maximum flood peaks) regression equation that forms part of the FEH statistical method can also be used where the appropriate parameters are known or can be derived/estimated.**
>
> **Where developments are smaller than 50 ha, the analysis for determining the greenfield index flood flow rate should use 50 ha in the formula and linearly interpolate the flow rate value based on the ratio of the development area.'**

4.39. Discharge rate criteria are set out in Point 8 of the 'Rainfall Runoff Management for Developments – Interim National Procedure Principles' in the Environment Agency's Report – SC030219. It states:

> **'The Environment Agency will normally require that, for the range of annual flow rate probabilities, up to and including the 1% annual probability (1 in 100 year) event, the developed rate of runoff into a watercourse should be no greater than the undeveloped rate of runoff for the same event based on the calculation of Q_{BAR} or Q_{MED} and the use of FSSR growth curves. Exceptions only apply where it is not practical to achieve this due to either constraints on the size of the hydraulic control unit (see point 17), or excessive storage volumes. The purpose of this is to retain a natural flow regime in the receiving watercourse and not increase peak rates of flow for events of an annual probability greater than 1%. Three annual probabilities are used to define discharge compliance limits though the critical criteria are for the lowest and highest frequency events; 100% (1 year), 3.33% (30 year) and 1% (100 year).'**

4.40. Volumetric criteria are set out in Point 10 of the 'Rainfall Runoff Management for Developments – Interim National Procedure Principles' in the Environment Agency's Report – SC030219, which states:

'Theoretically the stormwater runoff volume from a site should be limited to the greenfield runoff volume for all event frequencies. However this is technically extremely difficult to achieve and therefore compliance to two criteria on runoff volume is required.'

4.41. The two criteria are set out in Points 10.1 and 10.2 as 'Interception' and 'Additional runoff due to development'. Point 10.1 states:

'Interception. Where possible, infiltration or other techniques are to be used to try and achieve zero discharge to receiving waters for rainfall depths up to 5mm.'

4.42. Point 10.2 states:

'Additional runoff due to development. The difference in runoff volume pre- and post-development for the 100 year 6 hour event should be disposed of by way of infiltration, or where this is not feasible due to soil type, discharged from the site at flow rates below 2 l/s/ha.'

4.43. Point 10.3, of the 'Rainfall Runoff Management for Developments – Interim National Procedure Principles' in the Environment Agency's Report – SC030219, states:

'Where compliance to 100 year volumetric criterion is not provided, the limiting discharge for any return period up to the 100 year event shall not be greater than the mean annual peak rate of runoff for the greenfield site (Referred to as Q_{BAR} in IH Report 124) or 2 l/s/ha, whichever is greater.'

IH Report 124 Method

4.44. The ICP SuDS module in the MicroDrainage design software (Version 2020.1) enables the calculation of greenfield runoff rates based on the IH Report 124 estimation method with pro-rata values for sites smaller than 50ha.

4.45. Greenfield runoff rates have been determined using MicroDrainage design software (Version 2020.1) based on the method set out in IH Report 124. Catchment descriptors have been obtained from the Flood Estimation Handbook (FEH), published by the Institute of Hydrology. Rainfall and soil parameters have been obtained from maps in Volume V of the Flood Studies Report (FSR) within the MicroDrainage design software. FSSR 2 and 14 regional growth curve factors are used to calculate the greenfield peak flow rates for 1, 30 and 100 year return periods.

4.46. The FSR WRAP Map, shown in Appendix 4, indicates the site is located in 'Soil Index Class 4', which has the highest standard percentage runoff and suggests the underlying soil has low permeability.

4.47. Copies of the MicroDrainage greenfield runoff calculations for the site are included in **Appendix 7**. A summary of the greenfield runoff rates for the various return period events is shown in **Table B**. The mean annual peak rate of runoff, referred to as Q_{BAR} in IH Report 124, is 11.4 l/s.

Table B: Greenfield Runoff Rates

Return Period (Years)	1	Q_{bar}	30	100
Greenfield Runoff Rates (l/s)	9.7	11.4	25.8	36.4

4.48. By limiting the developed rate of runoff to the mean annual peak rate of runoff, Q_{BAR}, for all rainfall events up to the 100 year return period event, including an allowance for climate change, the proposed development would reduce flood risk overall when compared to existing greenfield rates.

Surface Water Flow Balancing

4.49. The use of flow balancing methods, comprising a detention basin, swales, pervious paving and large diameter pipes, is proposed in order to attenuate surface water runoff to greenfield runoff rates with discharge to the local watercourse and ditch system.

4.50. Preliminary storage calculations have been undertaken to establish the required storage for the development catchment areas on the site using the Network module in XP Solutions' Micro Drainage software system (Version 2017.1.2) for the 1 in 1, 30 and 100 year events plus a 20% and 40% increase in peak rainfall intensity to take account of climate change. The outflow from the drainage system has been constrained to Q_{BAR}, which approximates to a return period of 2.3 years, and hence a reduced rate of runoff for higher return periods. Copies of the Micro Drainage storage estimate screenshot results output for the development catchment areas are reproduced in **Appendix 8**.

4.51. For the preliminary storage calculations, it has been assumed that the developed areas would give rise to net rise of 65% of impermeable areas. **Table C** below shows the development catchment areas, the allowable discharge based on the catchment area and a Q_{BAR} value of 11.4 l/s, the required average storage in the detention basin for the 1 in 100 year event, including 20% and 40% allowances for climate change, and the resulting discharge.

Table C: Runoff Rates

Dev Catchment Area	Area (ha)	Imp Area (Ha)	Allowable Discharge (l/s)	1 in 100 yr + 20% CC Storage Vol. (m^3)	Resulting Discharge (l/s)	1 in 100 yr + 40% CC Storage Vol. (m^3)	Resulting Discharge (l/s)
A	1.73	0.72	10.5	386.5	10.4	482.4	10.5

4.52. **Table D** shows the peak runoff rate from the development during the 1 in 1 year and 1 in 100 year rainfall events for the greenfield and post development situations.

Table D: Runoff Rates

	Greenfield	Post-development
1 in 1 year (l/s)	9.7	7.0
1 in 2 year (l/s)	10	7.4
1 in 30 year (l/s)	25.8	10.0
1 in 100 year	36.4	10.5
1 in 100 year plus 20% climate change	43.68	10.5
1 in 100 year plus 40% climate change	50.96	10.5

4.53. The detention basin, swales, pervious paving and large diameter pipes shown on the Indicative Surface Water Drainage Strategy plan, Drawing No. C795/2 in Appendix 6, indicate the location and sizes of the required storage facilities to serve the various development areas and are subject to detailed design.

4.54. From an inspection of Table D it can be seen that the peak runoff rate from the development for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event never exceed the peak greenfield runoff rate for the same event. The proposed surface water drainage measures therefore ensure the proposed development satisfies the peak flow control standards in the Government's 'Non-statutory technical standards for sustainable drainage systems'.

4.55. The above plan and calculations demonstrate that a suitable means of drainage can be provided to drain the developed site in terms of surface water runoff in accordance with the guidance and standards laid down.

4.56. The development site was previously developed. The topographical survey shows a number of drainage features, but does not provide full details for the drainage systems serving the existing development on the site. The proposed redevelopment would limit the runoff rate to the Greenfield runoff rate of Q_{BAR} and discharge it via the existing outfall pipe into the nearby brook. The proposed surface water drainage measures would ensure that the development satisfies the peak flow control standards in the Government's 'Non-statutory technical standards for sustainable drainage systems'.

Urban Creep

4.57. Paragraph 85 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-085-20150323) advises that any sustainable drainage system should be designed so that the capacity takes account of the likely impacts of climate change and likely changes in impermeable area within the development over its lifetime and continues to provide effective drainage for properties. The likely changes in impermeable area within the development over its lifetime are considered under the term urban creep.

4.58. Urban creep is defined in The SuDS Manual 2015 (CIRIA C753) as any increase in the impervious area that is drained to an existing drainage system without planning permission being required, and therefore without consideration of whether capacity of the receiving sewerage system can accommodate the increased flow. It is limited to residential development and for example covers the construction of patios, conservatories, paved driveways etc (post initial construction).

4.59. The Local Authority SuDS Officer Organisation (LASOO) document entitled 'Non-Statutory Technical Standards for Sustainable Drainage: Practice Guidance' sets out the appropriate allowances to be applied to the impermeable area within the property curtilage based on residential development densities. For a residential development with a density of 25 or less dwellings per hectare a 10% allowance is applied, reducing to 2% for a density of 50 dwellings per hectare and above, and 0% for flats and apartments.

4.60. The proposed residential development on the site equates to a density of 15 dwellings per hectare. Therefore, in order to ensure the capacity of the drainage system takes account of urban creep within the development over its lifetime, a 10% increase has been applied to the impermeable area within property curtilages when designing the drainage system.

Water Quality

4.61. Table 4.3 of the Suds Manual advises to utilise the Simple Index Approach described in Section 26.7.1 to assess the measures required to treat the surface water runoff from residential roofs, individual property driveways and low traffic roads.

4.62. A Pollution Hazard Assessment has been undertaken for each catchment following the guidance set out in the SuDS Manual, CIRIA C753, London 2015, Section 26.7 'Method of Managing Pollution Risk'. With reference to that document, the appropriate approach is the "simple index approach" for surface water and groundwater. Extracts from Tables 26.2 and 26.3 are set out below.

4.63. For managing pollutant risk, pervious paving is proposed for the private parking in the residential development which allows for infiltration through the structure, treating the runoff before entering into the proposed surface water drainage system, as shown on Drawing number C795/2 - Indicative Surface Water Drainage Strategy, contained in Appendix 6.

Table E: Pollution Hazard Indices for Different Land Use Classification

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Individual property driveways, residential parks, low traffic roads (eg cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Total		**0.5**	**0.4**	**0.4**

4.64. As the implementation of an on-line basin is not feasible, due to elevation issues, pervious paving is proposed to treat the runoff before it enters the surface water sewer system.

Table F: Indicative SuDS Mitigation Indices for Discharge to Surface Waters

Type of SuDS component	TSS	Metals	Hydrocarbons
Permeable pavement	0.7	0.6	0.7

4.65. The guidelines recommend that the total SuDS mitigation index must be greater than or equal to the pollution hazard index. Applying the criteria set out in Table 26.2 and 26.3 to each catchment is considered below.

4.66. The catchment is mainly in residential land use. The main pollution source would be oils and other materials released from parked vehicles. Pervious paving is proposed for private parking areas to alleviate this pollution factor. Residential roof runoff is designated in table 4.3 to have a pollution hazard level of “Very low”. Runoff from the roads would be intercepted by deep trapped gullies and /or swales which intercept suspended sediments and oils, providing a degree of treatment.

Table G: Hazard Indices against Mitigation Indices

Type of SuDS component	TSS	Metals	Hydrocarbons
Hazard Indices (as per table 26.2)	0.5	0.4	0.4
Mitigation Indices (as per Table 26.3) Permeable Paving	0.7	0.6	0.7

4.67. From an inspection of the tables above it can be seen that the mitigation indices are greater than or equal to the hazard indices. It is therefore considered that the provision of pervious paving and deep trapped gullies within the development would appropriately manage the quality of runoff discharging from the site.

Non-statutory technical standards for sustainable drainage systems

4.68. The Government published its ‘Non-statutory technical standards for sustainable drainage systems’ in March 2015. The technical standards relate to the design, construction, operation and maintenance of sustainable drainage systems and have been published as guidance. The Government expect these standards to apply to all developments of 10 homes or more and to major commercial development.

4.69. The 'Non-statutory technical standards for sustainable drainage systems' set out peak flow control standards (S2 and S3) and volume control technical standards (S4, S5 and S6).

4.70. Standard S2 states: *For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.*

4.71. Standard S3 states: *For developments which were previously developed, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.*

4.72. In terms of volume control, standard S4 states: *Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.*

4.73. Standard S5 states: *Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event*.

4.74. Standard S6 states: *Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk*.

4.75. In accordance with Points 8 and 10 of the 'Rainfall Runoff Management for Developments – Interim National Procedure Principles' in the Environment Agency's Report – SC030219, the limiting discharge rate that does not adversely affect flood risk, for any return period up to the 100 year event, is the mean annual peak rate of runoff for the greenfield site referred to as Q_{BAR}.

4.76. In terms of flood risk within the development, the Government's 'Non-statutory technical standards for sustainable drainage systems' include standards S7, S8 and S9.

4.77. Standard S7 states: *The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event*.

4.78. Standard S8 states: *The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (eg pumping station or electricity substation) within the development*.

4.79. Standard S9 states: *The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of 1 in 100 year rainfall event are managed in exceedance routes that minimise the risk to people or property.*

4.80. **Table H** below demonstrates how the proposed development complies with the relevant standards of the Government's 'Non-statutory technical standards for sustainable drainage systems'. Temporary

Table H: Compliance with Non-statutory technical standards for sustainable drainage systems

Standard	Justification for compliance
Flood risk outside the development	
S1	N/A
Peak flow control	
S2	N/A Previously developed site so S3 applies.
S3	The peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event never exceed the rate of discharge prior to redevelopment for that event.
Volume control	
S4	N/A Previously developed site so S5 applies.
S5	N/A S6 applies
S6	The runoff is discharged at a rate that does not adversely affect flood risk, corresponding to less than $Q_{BAR.}$
Flood Risk within the development	
S7	The surface water drainage system would be designed so that flooding does not occur on any part of the site for a 1 in 30 year rainfall event.
S8	The surface water drainage system would be designed so that flooding does not occur during a 1 in 100 year rainfall event within the development.
S9	The design of the site ensures that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.
Structural integrity	
S10	Components would be designed to ensure structural integrity of the drainage system under anticipated loading conditions over the design life of the development.
S11	The materials specified by the designer at the detailed design stage would be of a suitable nature and quality for their intended use.
Designing for maintenance considerations	
S12	N/A. Pumping is not proposed surface water drainage.
Construction	
S13	The mode of construction with the existing sewer would comply with the appropriate standards and be inspected by the relevant authority so would not be prejudicial to the structural integrity and functionally of the drainage system.
S14	Any damage to the drainage system would be rectified before the drainage system is completed to the satisfaction of the relevant authority.

Flood Risk Management Measures

4.81. A summary of the potential risk from all sources of flooding post-development with the various development mitigation measures incorporated is shown in **Table I** below.

Table I: Post-development Potential Flood Risk from All Sources of Flooding

Flood Source	Potential Risk				Description
	Very Low	Low	Medium	High	
Watercourses	X				The closest proximity watercourse is located 270m to the South East
Surface Water	X				The risk would be further mitigated by improving the existing surface water management system.
Groundwater	X				There is no risk reported from Groundwater Flooding.
Overwhelmed Sewers	X				The proposed drainage system, detention basin, swales and pervious paving would further mitigate any potential off-site sewer flooding affecting the site.
Artificial Sources	X				The site is not affected
Off-site Impacts	X				By reducing the rate of runoff and intercepting overland flows the proposed development would reduce flood risk overall.

4.82. The incorporation of flood mitigation measures as part of the proposed development would further reduce any risk from river, surface water, and groundwater flooding. By reducing the rate of runoff and intercepting overland flows the proposed development would reduce flood risk overall.

Safe Access and Egress

4.83. The site is located in an area of Flood Zone 1 and is not affected by Surface Water flooding.

Overland Flood Flow Paths

4.84. Standard S9 in the Government's 'Non-statutory technical standards for sustainable drainage systems' states that the design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of 1 in 100 year rainfall event is managed in exceedance routes that minimise the risk to people or property.

4.85. Overland flood flow paths would follow the natural topography of the land towards the South-East. The design of the internal road network would convey flows towards the South-East in line with the existing situation. Indicative overland flow paths for an extreme event are shown on Drawing No. C795-03 - Overland Flowpath in **Appendix 9**.

Off Site Impacts

4.86. By reducing the rate of runoff and intercepting uncontrolled overland flows the proposed development would reduce flood risk overall.

Occupants and Users of the Development

4.87. In accordance with the model checklist in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-068-20161116), this section provides a summary of the numbers of future occupants and users of the new development; the likely future pattern of occupancy and use; and proposed measures for protecting more vulnerable people from flooding.

4.88. Compared with the current use, the development proposals would increase the overall number of occupants and/or people using the building or land by approximately 111 people (37 units x average of 3 persons per unit).

Residual Risk

4.89. Paragraph 41 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-041-20140306) advises that residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual risk include:

- the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;
- failure of a reservoir, or;
- a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

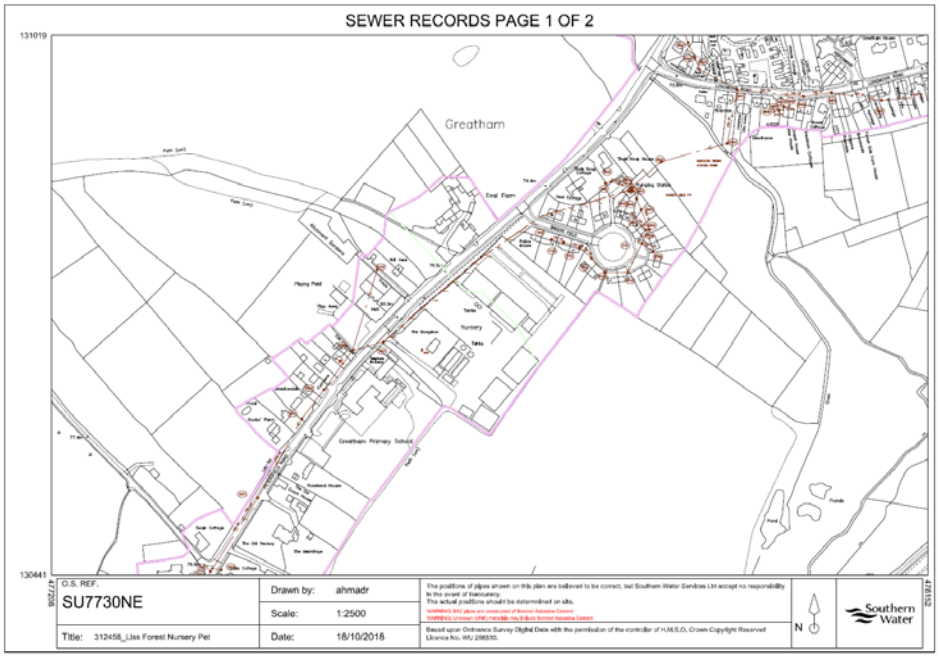
4.90. The site lies within Flood Zone 1 and so the proposed development is fully in accordance with the sequential approach to development set out in the NPPF, the aim of which is to steer new development to areas with the lowest probability of flooding.

4.91. The proposed drainage measures would ensure that there is little or no residual risk of property flooding occurring during events well in excess of the minimum acceptable standard of protection for new property, which requires that no flooding of property should occur as a result of a one in 100 year storm event including an appropriate allowance for climate change.

4.92. For extreme events it is considered that the proposed development would intercept any uncontrolled overland flow and direct it into the proposed drainage system. The proposed drainage measures would ensure the proposed development would have adequate flood protection for extreme events over the lifetime of the development.

Foul Water Drainage

4.93. Enquiries have been made to Southern Water to establish the location of the existing public sewers in the vicinity of the site, the available capacity at the sewage treatment works, and the adequate point of connection to the public foul water sewer system for the proposed development. A copy of the sewer map is reproduced in **Figure 7 below**.



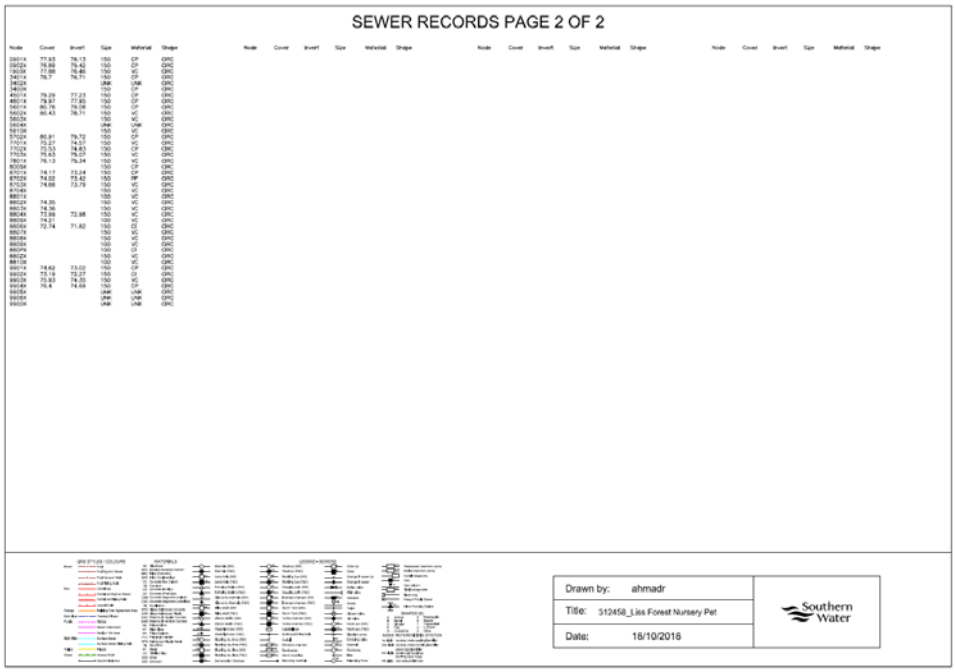


Figure 7: Southern Water Sewer Map

4.94. The public sewer map indicates there is existing public foul water sewers located to the west of the site on Peterfield Road. A pumping station would be required to connect the development to the existing sewer network.

4.95. In terms of foul water drainage, it has been demonstrated that a suitable means of drainage can be provided to serve the proposed development.

Maintenance Strategy

4.96. Paragraph 165 of the NPPF states that for major developments the sustainable drainage systems used should have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development.

4.97. Paragraph 81 in the Flood Risk and Coastal Change Planning Practice Guidance (Reference ID: 7-081-20150323) advises that in considering a development that includes a sustainable drainage system the local planning authority will want to be satisfied that there are clear arrangements in place for ongoing maintenance. Paragraph 85 goes onto advise that when planning a sustainable drainage system, developers need to ensure their design takes account of maintenance requirements of both surface and subsurface components so that it continues to provide effective drainage for properties.

4.98. In terms of the maintenance strategy for the proposed drainage measures, it is proposed that the main surface and foul water drainage systems would be adopted by Southern Water, in its role as sewerage undertaker, under a Section 104 Agreement of the Water Industry Act 1991. Southern Water would therefore be responsible for the future maintenance of the adopted drainage systems.

4.99. It is proposed that the SuDS system, comprising the detention basin and swales would be adopted by Southern Water based on the Design and Construction Guidance (DCG), or be maintained by a Management Company. Pervious pavements located within property curtilages would be the responsibility of the home owners.

4.100. Roads and footways, including highway drainage rain gardens and gullies would be maintained by a Management Company.

4.101. Guidance on the operation and maintenance requirements of sustainable drainage systems is contained in The SuDS Manual 2015 (CIRIA C753). There are three categories of maintenance: regular, occasional and remedial. The Management Company would be responsible for putting in place a suitable maintenance plan.

4.102. Regular maintenance consists of basic tasks including litter and debris removal, grass cutting, and vegetation management, and includes inspections and monitoring to identify potential system failures such as blockages, silt and sediment build-up, eroded or damaged areas, and condition of inlets and outlets.

4.103. Occasional Maintenance comprises tasks that are likely to be required periodically, for example, sediment removal and vegetation replacement.

4.104. Remedial Maintenance comprises intermittent tasks to rectify faults and would comprise inlet/outlet repairs, erosion repairs, and dealing with a spillage event.

5. CONCLUSIONS

5.1. This Flood Risk Assessment has been prepared in connection with a proposed Development of 37 residential dwellings (including affordable homes), alterations to the existing access onto Petersfield Road, hard and soft landscaping, drainage and all other associated development works on land at Liss Forest Nursery, Petersfield Road in Greatham, Liss.

5.2. The overall site comprises around 2.4 hectares and is located to the South East of Petersfield Road and to the South West of Bakers Field, which lies in the district of East Hampshire. The postcode is GU33 6EU, and the approximate grid reference for the site is X: 477680, Y: 130730.

5.3. The Site is allocated for development in the South Downs local Plan: Adopted July 2019 as "Allocation Policy SD71: Land at Petersfield Road, Greatham".

5.4. With reference to the Environment Agency's Flood Map for Planning, the site falls entirely within Flood Zone 1, which has the lowest probability of flooding.

5.5. In relation to Flood Risk Vulnerability and Flood Zone 'Compatibility', the planning practice guidance to the NPPF advises that all uses of land are appropriate in Flood Zone 1. On this basis, the Sequential Test is passed.

5.6. In addition to flooding from rivers, this Flood Risk Assessment has considered the potential consequences of flooding from all other sources, which include directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs and other artificial sources.

5.7. An assessment has been made of the potential risk from all sources of flooding to and from the development site, with reference to available flood risk information, for existing conditions pre-development, and post-development with the various development mitigation measures incorporated.

5.8. The available flood risk information includes: The Environment Agency's Flood Map for Planning, local flood history data from all sources of flooding; the GOV.UK 'Long Term Flood Risk Information' interactive maps; and flooding information in the SFRA.

5.9. The pre-development potential flood risk to the site from all sources of flooding is considered to be Very low.

5.10. In terms of providing an acceptable standard of protection against flooding for new development, no flooding of property should occur as a result of the 'design flood' corresponding to a 1 in 100 year fluvial flood event, taking account of climate change.

5.11. The British Geological Survey (BGS) geological mapping of the area shows the majority of the site is underlain by Folkestone formation – Sandstone and Sedimentary bedrock.

5.12. A site investigation was undertaken by Leap Environmental Ltd. in October 2017. As part of the site investigation, soakage tests were carried out in four locations across the site in accordance with BRE Digest 365. Tests in three of the four locations failed, with only the test at WS8 registering a result. The site investigation report includes Borehole Logs from across the site. Clay was encountered in all of the Boreholes recorded.

5.13. Based on the site investigation it is considered that the use of soakaways would not provide a suitable means of draining surface water runoff from development on the the site.

5.14. A sustainable drainage strategy, involving the implementation of SuDS, is proposed for managing the disposal of surface water runoff from the proposed development on the site.

5.15. As the use of infiltration devices is not appropriate for the site, flow balancing methods are proposed, comprising a detention basin, swales and large diameter pipes, in order to attenuate surface water runoff to greenfield runoff rates with discharges to the local watercourse.

5.16. The proposed drainage strategy would ensure that surface water arising from the developed site would be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

5.17. Greenfield runoff peak flow rates have been derived using the guidance in the Environment Agency's 'Rainfall runoff management for developments' Report – SC030219 published in October 2013. In accordance with this guidance the limiting discharge for any return period up to the 100 year event would not be greater than the mean annual peak rate of runoff for the greenfield site, referred to as $Q_{BAR,}$ which approximates to a return period of 2.3 years, and hence a reduced rate of runoff for higher return periods.

5.18. By limiting the development rate of runoff to the mean annual peak rate of runoff, Q_{BAR}, for all rainfall events up to the 1 in 100 year return period event, including an allowance for climate change, the proposed development would reduce flood risk overall when compared to existing greenfield rates.

5.19. The proposed drainage measures would ensure that there is little or no residual risk of property flooding occurring during events well in excess of the minimum acceptable standard of protection for new property, which requires that no flooding of property should occur as a result of a one in 100 year storm event taking account of climate change.

5.20. For extreme events, it is considered that the proposed development would intercept any uncontrolled overland flow and direct it into the proposed drainage system. The proposed drainage measures would, therefore, ensure the proposed development would have adequate flood protection for extreme events over the lifetime of the development.

5.21. The Micro Drainage calculations contained in this Flood Risk Assessment demonstrate that a suitable means of drainage can be provided to drain the developed site in terms of surface water runoff in accordance with the guidance and standards laid down.

5.22. The proposed development complies with the relevant standards of the Government's 'Non-statutory technical standards for sustainable drainage systems'.

5.23. In terms of foul water drainage, it has been demonstrated that a suitable means of drainage can be provided to serve the proposed development.

5.24. The proposed foul and surface water drainage arrangements can be covered by a suitably worded condition requiring the submission of details to be submitted to and approved by the Local Planning Authority.

5.25. A maintenance strategy for the proposed foul and surface water drainage measures to serve the development has been set out in this document.

5.26. This Flood Risk Assessment has demonstrated that the proposed development is compliant with the NPPF, DEFRA/Environment Agency guidance, and Local Plan Policies.

5.27. The overall conclusions drawn from this Flood Risk Assessment are that the development would be appropriately safe for its lifetime taking account of the vulnerability of its users, the development would not increase flood risk elsewhere, and would reduce flood risk overall.

Appendices

Appendix 1

Flood risk assessment in flood zone 1 and critical drainage areas - Detailed guidance

You need to do a flood risk assessment if your development is in flood zone 1 and:

- more than 1 hectare
- in an area with critical drainage problems as notified by the Environment Agency

You also need to do a flood risk assessment if your development could be subject to other sources of flooding (eg surface water drains). This includes a change of use to an existing development that makes it more vulnerable to flooding.

Check with your lead local flood authority to see if your development would be affected by other sources of flooding.

Contact your local planning authority to check if your development is in an area with critical drainage problems as notified by the Environment Agency.

You also need to do a flood risk assessment if your development could be affected by other sources of flooding (eg surface water drains) or if the development is now classed as 'more vulnerable' following a change of use. Check this with your lead local flood authority - contact your local council to find out who this is.

Your written flood risk assessment can be in any format but must include the relevant plans, surveys and assessments. Check with your local planning authority if they have any specific software requirements, eg for producing detailed hydraulic models.

Research your development site

Contact the following organisations for information about flood risk in your area:

- your lead local flood authority

Contact your local planning authority or check the planning section of their website for their strategic flood risk assessment if one has been adopted as part of the local plan. Refer to the strategic flood risk assessment in your own flood risk assessment.

Check with the Environment Agency if you need to get Environment Agency flood defence consent (permission to do work on or near a main river in England).

Plans

You need to provide a location plan showing:

- street names
- any rivers, streams, ponds, wetlands or other bodies of water
- other geographical features, eg railway lines or local landmarks such as schools or churches

You can buy a location plan from the Ordnance Survey.

You also need to provide a site plan showing:

- the existing site
- your development proposal
- any structures that could affect water flow, eg bridges, embankments

Surveys

You need to provide a survey showing:

- existing site levels
- the levels of your proposed development

Check with your local planning authority if you also need to show your site in relation to its surroundings.

If you do, you'll have to put site levels in relation to the Ordnance Datum (the height above average sea level). You may be able to find Ordnance Datum information from the Ordnance Survey. If not, you'll need to pay for a land survey carried out by a qualified surveyor.

Assessments

Assess what the risk would be to your development if there was a flood. Consider flooding from other sources (eg surface water drains, a canal) as well as from rivers and the sea.

You should also consider climate change in your assessment.

Surface water drainage

You also need to assess surface water runoff on the site and provide:

- an estimate of how much surface water runoff your development will generate
- details of existing methods for managing surface water runoff, eg drainage to a sewer

- your plans for managing surface water and for making sure there's no increase in the volume of surface water and rate of surface water runoff

Surface water runoff describes flooding from sewers, drains, groundwater, and runoff from land, small water courses and ditches that occurs as a result of heavy rainfall.

Make sure your plans for managing surface water are in line with:

- guidance on managing surface water runoff in your local planning authority's strategic flood risk assessment
- guidance from your lead local flood authority

Developments on or near main rivers

State in your assessment if you need Environment Agency flood defence consent and if you've applied for it if so.

Submit your flood risk assessment

Submit your completed flood risk assessment with your planning application to your local planning authority.

They'll review your flood risk assessment and tell you if it's satisfactory.

Appendix 2

Rev	Date	Drawn	Checked

X 15/09/20 MJW
Footpath opposite plot 1 amended. Hedges repositioned. Minor amendments.

Z 27/03/21 PH
Various amendments to client's request

Z1 01/04/21 PH
Car port to Plots 20-21 increased to 6m wide.
Road radius opposite Plots 20-23 increased, and Plots 21-22 pushed forward slightly.
Minor amendments to landscaping, and indicative rear garden hedges shown.
Minor amendments to bin store & collection locations.

Z2 21/04/21 PH
Plots 23-24 shown as link-detached.
Landscaping amended to suit.

Z3 06/05/21 PH
Entrance road adjusted - Plots 1-3 repositioned.
Plots 4, 23 & 24 shown as front gabled.
Plots 3-4, 21-22 roof configurations amended.
Plots 9-9, 11, 28, 35-37 rotated/relocated.
Minor amendments to landscaping features.
Garages increased to 3.3m internal width.

Z4 18/05/21 PH
4no. visitor spaces added opp Plots 11,12,14 & 15.
Road widths amended to suit tracking overruns.
Extra parking space added to Plots 11-13,15,28 & 29.
Green car port roofs added to Plots 8,9 & 30,31.
Green car port roofs shown to Plots 20-24.
Rear garden hedge planting added as requested

Z5 02/06/21 PH
Road widened to central area to to suit tracking.
Access / driveways to plots 4, 8 & 9 amended.
Plot 12 garage swapped for car port.

Z6 23/06/21 PH
Verge amended to Plot 16.
Car port shown to Plot 14.

Legend

- Application Boundary
- Indicative Tree Position
- Indicative Landscaping
- Existing Tree
- Existing Tree
- Existing Hedge
- Parking Space
- Main Entrance
- Secondary Entrance
- Garage Entrance
- Bin Storage Area
- Bin Collection Point
- Communal Bin Store (BS)
- Communal Cycle Store (CS)
- Shed Location
- 2m Brick Wall
- 1.8m Closed Board Fence
- 1.8m Larchlap Fence
- 1m Picket Fence

Project:
LISS FOREST NURSERY
PETERSFIELD ROAD
GREATHAM

Drawing Title:
SITE LAYOUT (37 UNITS)
PLANNING LAYOUT

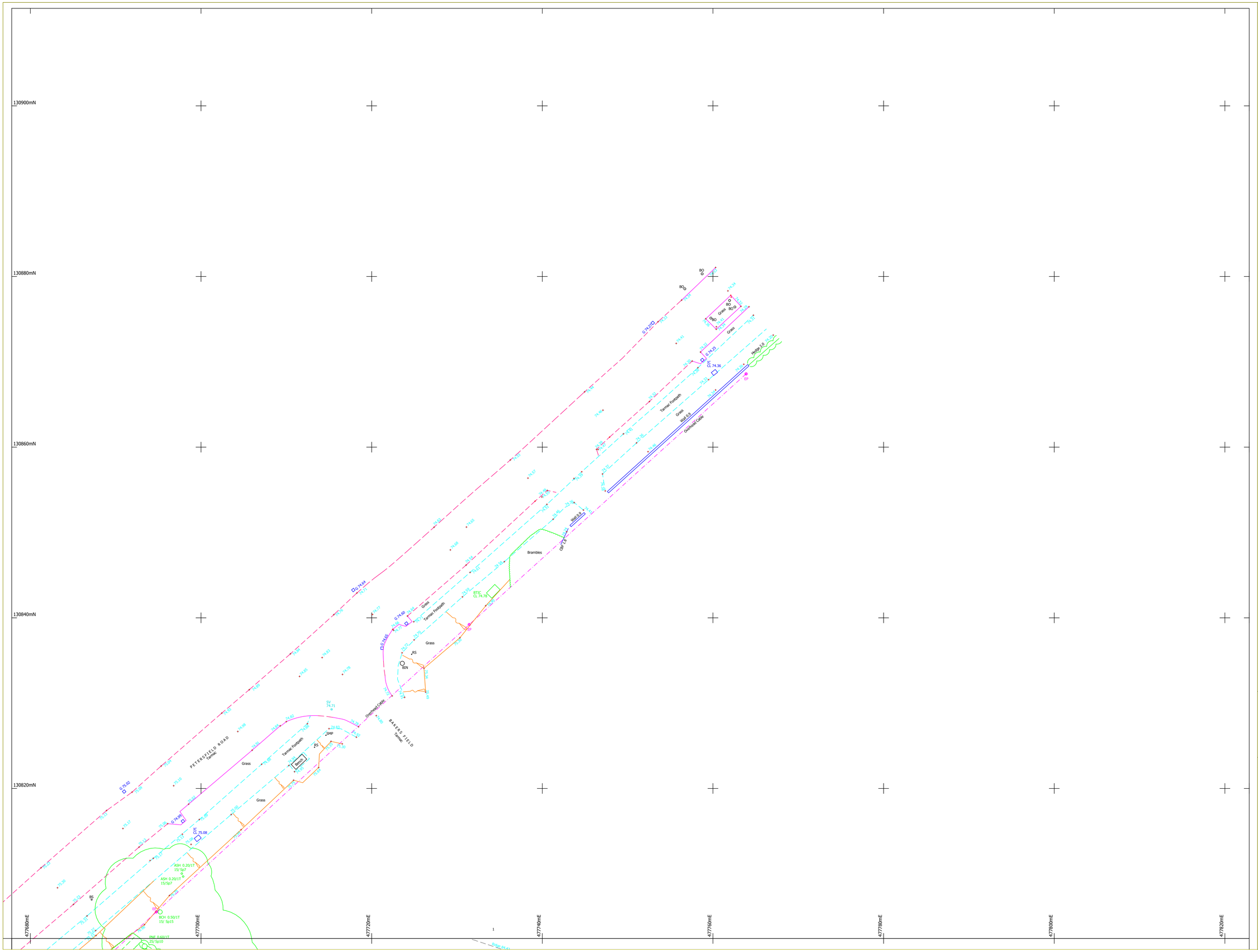
COVE HOMES

carlton design partnership
Selwyn House, 52a Castle Way, Southampton, SO14 2AW
023 8011 8866 www.carltondesignpartnership.com

1:500 @A1 | 0 5 10 15 20 25m

Drg No: 150715/SL37/01 Rev: Z6

Appendix 3



NOTES:

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LEGEND

TREE SPECIES INFORMATION

ALDER	ALD	LOCUST	LOC
ASH	ASH	LONDON PLANE	LPN
ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PNE
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PNS
FIR	FIR	RHODODENDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SIB
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HRM	WALNUT	WNT
LABURNUM	LRM	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPU
		COPPICED	COP

TREE ANNOTATIONS: Tree Species / Tree Boll Size / No of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDL
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITTISH TELECOM BOX	BTB	POST	P
BRITTISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CATV	RODDING EYE	RE
EARTHING ROD	ER	SERVICE MARKER POST	SMP
ELECTRICITY CABLE PIT	ELCP	SOIL VENT PIPE	SVP
ELECTRICITY CONTROL BOX	ECB	STOP COCK	SC
ELECTRICITY POLE	EP	STOP VALVE	SV
FIRE HYDRANT	FH	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNALS IC	TSIC
LITTER BIN	BIN	WATER METER	WM
KERB OUTLET	KO	WATER TAP	Tap
NAME PLATE	NP		

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ENCOMPASS SURVEYS

Encompass Surveys Ltd
Unit 2CA
Deer Park Farm Industrial Estate
Knowle Lane
Fair Oak, Eastleigh
Hampshire SO50 7PZ

Tel: 023 80692002 Email: info@encompass-surveys.co.uk
Fax: 023 80697125 Website: encompass-surveys.co.uk

Client:	Cove Homes		
Survey Location:	Liss Forest Nursery Petersfield Road Greatham GU336HA		
Survey type:	Topographical	Scale:	1:200@A1
Drawing ref:	ENC/070817/SZ3-1	Date:	August 2017
Drawn/QA:	AB / DH	Revision:	-

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HORSE CHESTNUT	HCH	SYCAMORE	SYC
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130800mN
130780mN
130760mN
130740mN
130720mN
130700mN
477540mE
477560mE
477580mE
477600mE
477620mE
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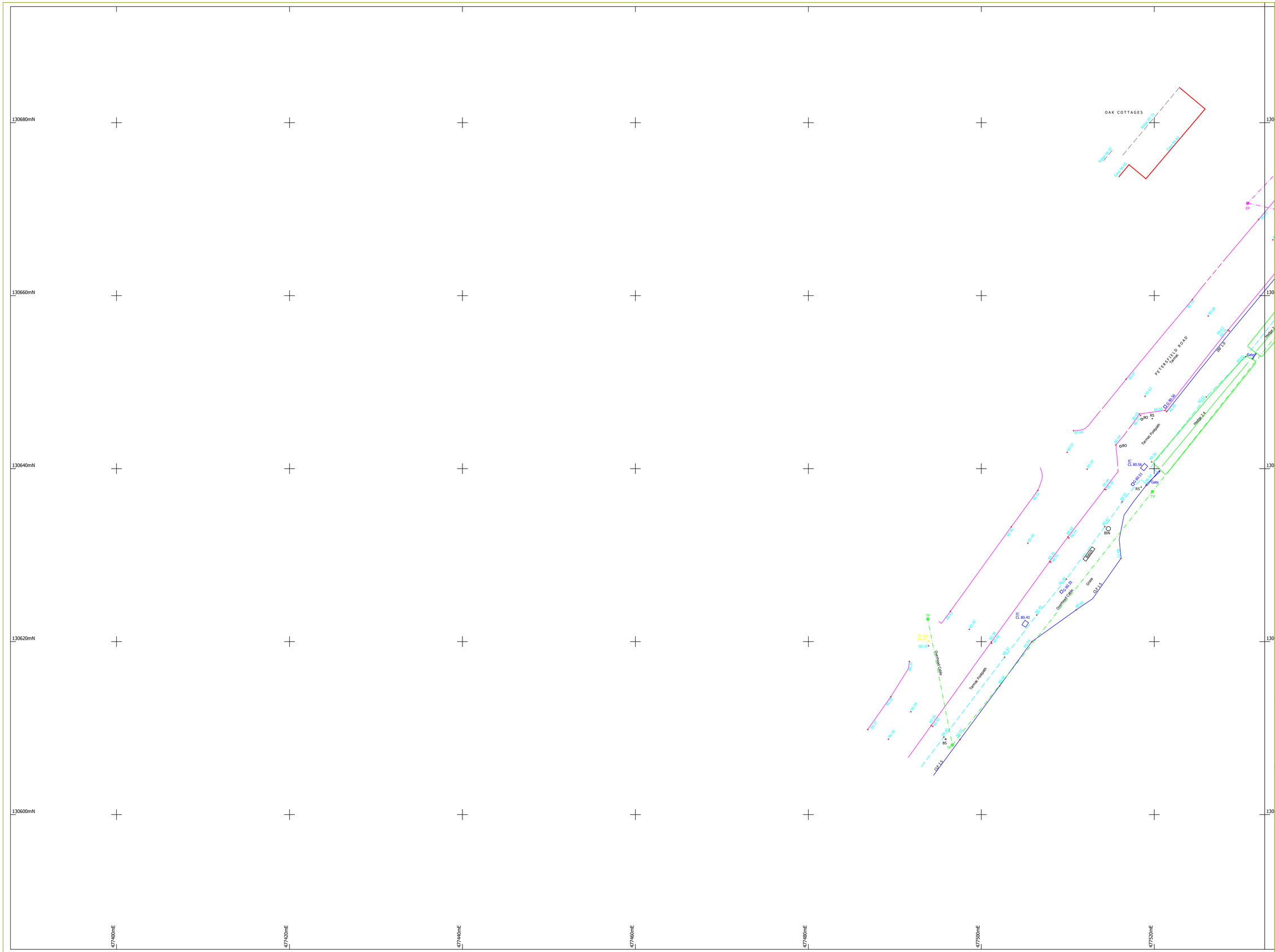

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ALDER	ALD	LOCUST	LOC
ASH	ASH	LONDON PLANE	LPN
ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MPL
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PNE
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PNS
FIR	FIR	RHODODENDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SIB
HAZEL	HAZ	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HRM	WALNUT	WNT
LABURNUM	LRM	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN OR PRIPICED	SPU COP

TREE ANNOTATIONS: Tree Species / Tree Boll Size / No of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING	CPF
CRASH BARRIER	CBR
HANDRAIL	HDL
IRON RAILINGS	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCE	MSF
PALISADE FENCE	PSF
PICKET FENCE	PKF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE FENCE	PWF
STOCK WIRE FENCE	SWF
TRELLIS FENCING	TLF

LEVEL INFORMATION

BASEMENT LEVEL	BTL
BED LEVEL	BL
COVER LEVEL	CL
DAMP PROOF COURSE	DPC
FLOOR LEVEL	FL
INVERT LEVEL	IL
OUTFALL LEVEL	OL
THRESHOLD LEVEL	THL
FOUL WATER	FW
SURFACE WATER	SW
UNABLE TO LIFT	UTL
WATER LEVEL	WL

SURFACE INFORMATION

CONCRETE	Conc
BRICK PAVERS	BP
FLOWERBED	FB
PAVING SLABS	PS
RETAINING WALL	RWall
TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITISH TELECOM BOX	BTB	POST	P
BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CATV	RODDING EYE	RE
EARTHING ROD	ER	SERVICE MARKER POST	SMP
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LITTER BIN	BIN	WATER METER	WM
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NAME PLATE	NP		

Level Datum:
Levels are related to OSGB15 derived from the GPS network

Grid:
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Northpoint:
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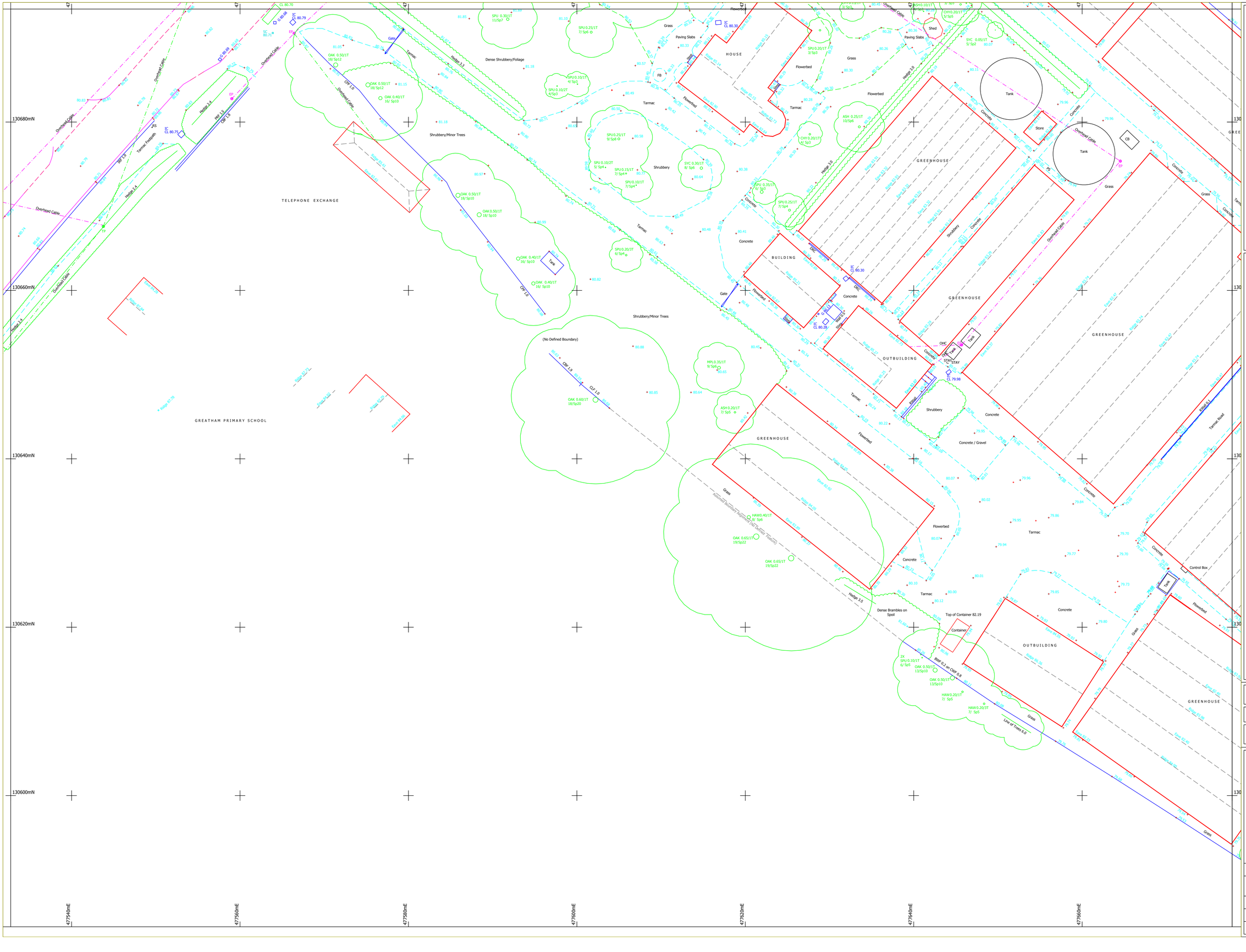
ENCOMPASS SURVEYS

Encompass Surveys Ltd
Unit 2CA
Deer Park Farm Industrial Estate
Knowle Lane
Fair Oak, Eastleigh
Hampshire SO50 7PZ

Tel: 023 80692002 Email: info@encompass-surveys.co.uk
Fax: 023 80697125 Website: encompass-surveys.co.uk

Client:	Cove Homes		
Survey Location:	Liss Forest Nursery Petersfield Road Greatham GU336HA		
Survey type:	Topographical	Scale:	1:200@A1
Drawing ref:	ENC/070817/5Z3-3	Date:	August 2017
Drawn/QA:	AB / DH	Revision:	-



NOTES:
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Drawing ref:	ENC/070817/5Z3-4	Date:	August 2017
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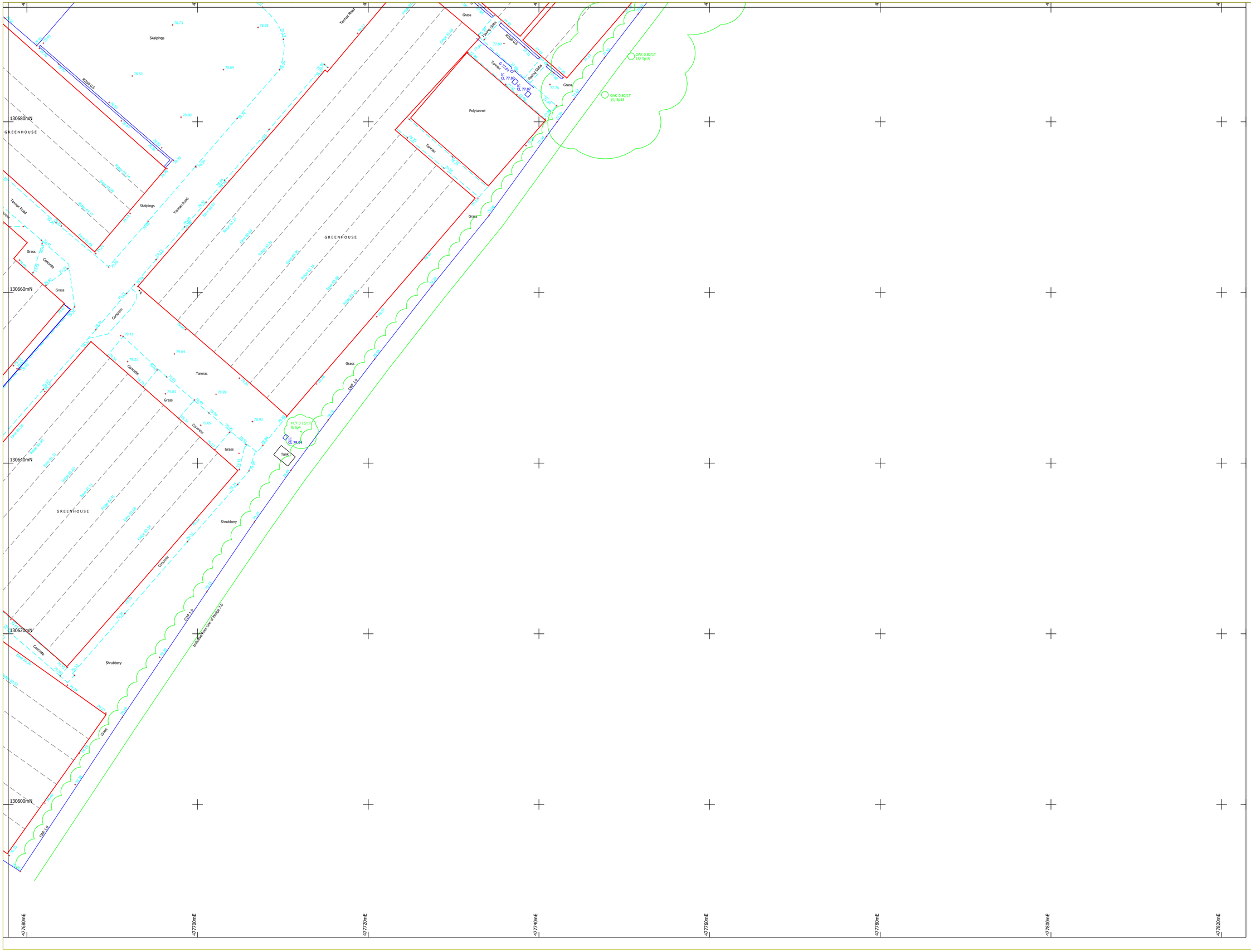

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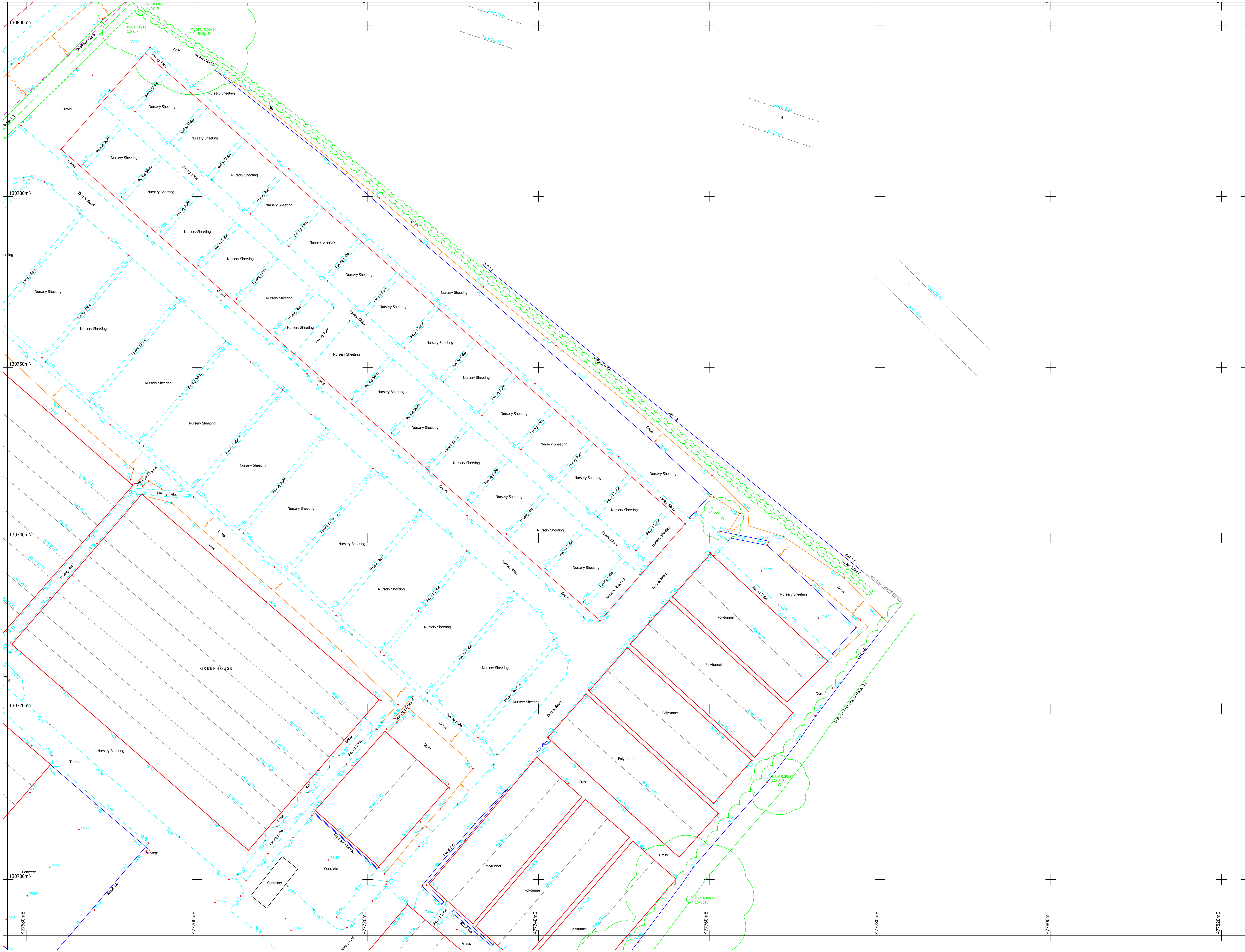

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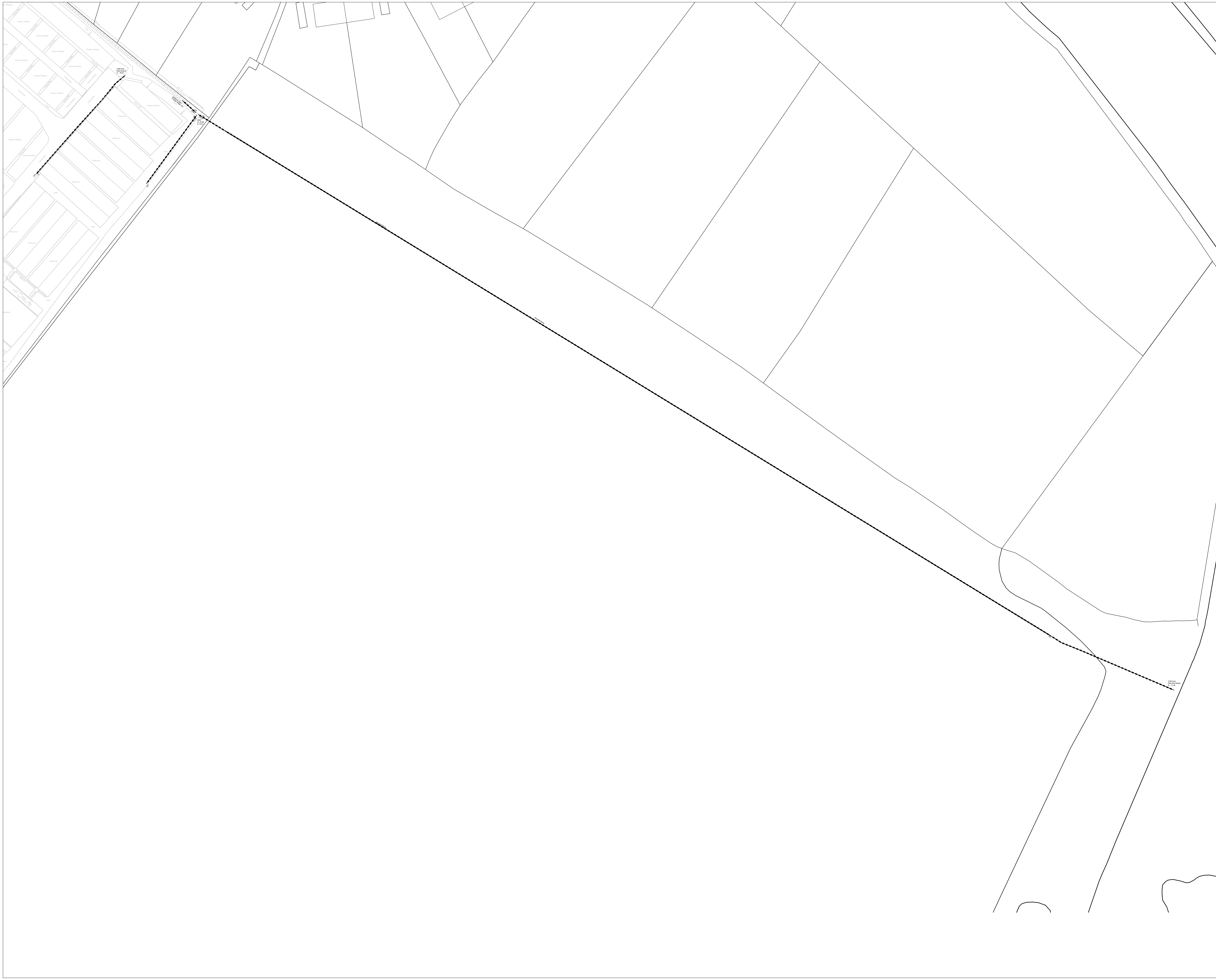
Drawn/QA:	AB / DH	Revision:	-



NOTES:

1. The base topographical survey has been supplied by Encompass Surveys.
2. A number of technologies were used to obtain the information shown on this drawing. Varying ground conditions can affect the performance of these systems, therefore 100% detection is not guaranteed. Always Exercise Caution When Excavating.
3. Thin line types represent assumed utility positions (as annotated).
4. Where electric & metallic services are illustrated on this drawing as a single utility line, these may represent multiple pipes/cables.
5. Possible radar targets show the position of suspected underground linear features, these features have produced an inconsistent response to the radar.
6. It is not always possible to differentiate between construction features and pipes, it is therefore possible that some of the features shown are not pipes or cables.
7. Every care has been taken to ensure the correct identification of the utility types, however these should be independently verified prior to use in any design/ building works.
8. All pipe diameters and levels are assumed to be correct, however due to non entry to inspection chambers, these should be verified before any works commence.
9. Depths shown with the suffix (RD) have been measured using radio frequency locators and are to the centre of pipes/cables. Depths shown with the suffix (S) have been measured to a radio frequency sewer sonde and are to the invert of pipes. Therefore these depths are indicative only.
10. All utility depths are in metres unless otherwise stated
11. All pipe/duct sizes are in millimetres unless otherwise stated
12. Information provided should not be altered or modified in any way. It should not be used for any purpose other than for which it was intended and should not be issued to other parties without prior agreement of Encompass Surveys.
13. Encompass Surveys cannot accept any responsibility for any damage to computer systems which may result from viruses which may be contained in the data provided.
14. If the Autocad drawing is being read by any system other than Autocad it should be checked against a hard copy. Encompass Surveys cannot accept liability for omissions.
15. Scale indicated is only applicable when plotted at sheet size

LINE-TYPE KEY

Electricity
British Telecom
Water
Gas
Foul Water
Storm Water
Metallic
Telecom
Empty Duct
Mercury Comms
Fibre Optics
Earth Strips
Virgin Media
Cable TV
Low Voltage
11Kv High Voltage
33Kv High Voltage
Fuel Pipe
Hot Water
Combined Sewer
Traffic Control Signalling
Strong Radar Target
Weak Radar Target

GPR Detected Anomaly

GPR Detected Reinforcing

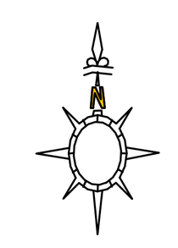
Extents of Chamber

Scan Area
Unable to Scan Area

ABBREVIATIONS

AV	Air Valve	IRS	Illuminated Road Sign
BB	Belisha Beacon	LP	Lamp Post
BCD	Bottom of Chamber Depth	MH	Manhole
BH	Borehole	MKR	Marker
BL	Basement Light	MW	Monitoring Well
BM	Bench Mark	P	Post
BO	Bollard	PB	Post Box
BS	Bus Stop	PE	Polyethylene
BT	British Telecom Cover	RE	Rodding Eye
CAB	Cabinet	RG	Rain Gully
CATV	Cable Television Cover	RS	Road Sign
CCTV	Closed Circuit TV	SI	Spun Iron
CD	Chamber Depth	SP	Sign Post
CL	Cover Level	ST	Steel
CO	Concrete (Pre-Cast)	STN	Survey Station
DI	Ductile Iron	SV	Stop Valve
DP	Down Pipe	SWCP	Surface Water Catch Pit
EJB	Electricity Junction Box	SWSA	Surface Water Soak Away
EOT	End Of Trace	SW	Surface Water
EP	Electricity Pole	TCB	Telephone Call Box
ER	Earth Rod	TCD	Top of Chamber Depth
FB	Flower Bed	TL	Traffic Light
FH	Fire Hydrant	TLCB	Traffic Light Control Box
FL	Flood Light	TP	Telegraph Pole
FW	Foul Water	UTL	Unable To Lift
FWP	Foul Water Pipe	UTT	Unable To Trace
GM	Gas Meter	VP	Vent Pipe
GP	Gas Pipe	WLD	Water Level Depth
GV	Gas Valve	WM	Water Meter
IC	Inspection Cover	WSC	Water Stop Cock
ID	Invert Depth	WSV	Water Stop Valve
IL	Invert Level	WWO	Water Wash Out

Drawing orientation



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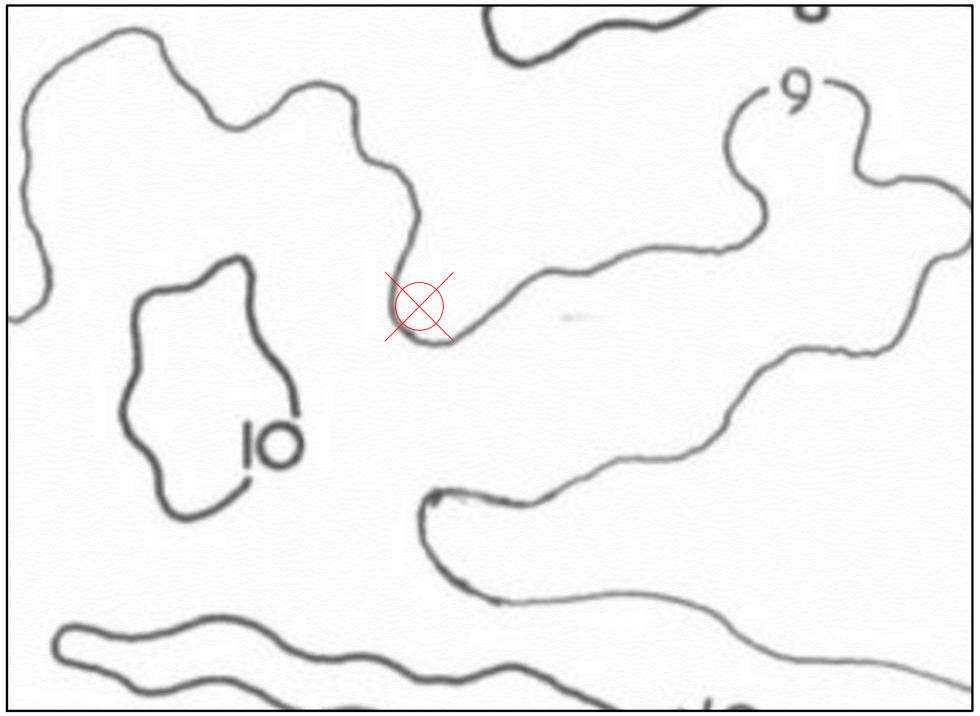
Client:	Cove Homes		
Survey Location:	Liss Forest Nursery Petersfield Road GU33 6HA		
Survey type:	Utility	Scale:	1:300@A0
Drawing ref:	ENC-240918-U5A9	Date:	Oct 2018
Drawn/QA:	DS	Plots:	1 of 1

Appendix 4

Location Plan



Standard Average Annual Rainfall (SAAR) (in hundreds of mm)

Winter Rain Acceptance Potential (WRAP)

PFA consulting

Stratton Park House, Wanborough Road
Swindon, SN3 4HG

Telephone
01793 828000

Website
www.pfaplc.com

Soil Classification			
Soil Class (WRAP)	Soil Index (IoH)	SPR (FEH)	St (ADAS)
1	0.15	10	0.1
2	0.30	30	0.5
3	0.40	37	0.8
4	0.45	47	1.0
5	0.50	53	1.3

Note:
Standard Average Annual Rainfall (SAAR) and Winter Rain Acceptance Potential (WRAP) map extracts shown on this drawing are reproduced from the maps contained in Volume V of the Flood Studies Report – NERC: 1975.

Rev	Date	Description	Drawn	Check
#	09/03/17	First Issue.	RML	CI
A	20/11/18	Amended to comments		

Status
FOR PLANNING

Client
COVE CONSTRUCTION, PETER CATT, VINCENT CATT AND NEILL CATT

Project
Liss Forest Nursery, Greatham, Liss Hampshire

Drawing Title
SAAR and WRAP Maps

Drawing No. C795/01 REV A

Date: November 2017 | Scale: Not To Scale

E-Mail: pschilbach@pfaplc.com

Appendix 5

APPENDIX F – BOREHOLE LOGS AND FIELDWORK GEOTECHNICAL TESTS

Borehole Logs and Fieldwork Geotechnical Tests

Leap Environmental Ltd
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Borehole Log

Borehole No.
HA1
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type HA
Location: Greatham, GU33 6EY		Level:	Scale 1:10
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By PC

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Grey/brown gravelly silty clay MADE GROUND. Gravel is fine to medium sub rounded flint.
					0.10			
								Firm grey/brown slightly gravelly sandy CLAY. Gravel is fine to medium rounded flint.
		0.20	ES					
		0.40	ES					
					0.50			Firm orange/brown sandy CLAY.
					1.00			End of borehole at 1.00 m

Remarks
Borehole terminated at 1.0m, dry and stable. Soakage test undertaken at 1.0m.

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Borehole Log

Borehole No.
HA2
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type HA
Location: Greatham, GU33 6EY		Level:	Scale 1:10
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By PC

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Pale yellow medium to coarse grained sand MADE GROUND over plastic membrane.
					0.10			
		0.20	ES					Brown slightly gravelly sandy clay MADE GROUND. Gravel is fine to medium angular brick and flint
					0.45			
		0.50	ES					Firm to stiff pale orange/brown sandy CLAY.
					0.60			End of borehole at 0.60 m

Remarks
Borehole terminated at 0.6m, dry and stable.

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Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By PC

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15	ES					Grass over brown sandy clay TOPSOIL with abundant roots and rootlets and occasional fine angular fragments of brick, flint and siltstone. Rare gravel of coarse angular siltstone noted.	
								Occasional to rare roots noted below 0.35m	
					0.50			Stiff orange mottled brown silty CLAY with dark brown rootlets and rare fragments of black fibrous organic matter up to 2.0m.	
								Hand Pen at 0.6m =200kPa	
		1.00 1.00	D	N=9 (1,1/1,2,3,3)					1
								Hand Pen at 1.1m =120kPa	
								Hand Pen at 1.6m =80kPa	
		2.00 2.00	D	N=6 (1,2/1,1,2,2)				*Becoming very gravelly below 2.0m. Gravel is fine to coarse angular to sub rounded siltstone.*	2
								Becoming slightly sandy below 2.7m	
		3.00 3.00	D	N=21 (2,2/3,5,6,7)					3
					3.50			Medium dense orange/yellow silty fine to medium grained SAND.	
					3.80			Medium dense pale yellow and white medium to coarse grained SAND.	
								Continued on next sheet	4

Remarks
Borehole terminated at 4.3m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 0.5m.

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Borehole Log

Borehole No. **WS1**
Sheet 2 of 2

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By PC

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		4.00		66 (4,13/66 for 225mm)				
					4.30			End of borehole at 4.30 m

Remarks
Borehole terminated at 4.3m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 0.5m.

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Borehole Log

Borehole No. **WS2**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By PC

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15	ES					Grass over grey/brown gravelly silty TOPSOIL.
					0.30			
		0.40	ES					Grey/brown slightly gravelly clay MADE GROUND. Gravel is fine to medium sub angular flint and brick.
					0.90			
	▼	1.00 1.00	ES	N=2 (1,0/1,0,1,0)				Pale grey/brown slightly clayey sandy MADE GROUND. Grave is fine to coarse angular brick, concrete, flint, slate. Rare fragments of plastic pipe. *Moderate water seepage associated with the pipe encountered at 1.0m*
					1.80			
		1.90	ES					Dark blue/grey sandy gravelly MADE GROUND. Gravel is fine to coarse blacktop.
								Hand Pen at 2.5m =50kPa
					2.90			
		3.00 3.00	D	N=15 (1,3/3,4,4,4)				Firm to stiff pale green/grey mottled pale brown gravelly silty CLAY. Gravel is medium sub rounded siltstone.
					3.20			
		3.50		68 (7,13/68 for 225mm)				Very dense pale brown and mottled pale grey fine grained SAND.
					3.80			End of borehole at 3.80 m

1 2 3 4

Remarks
Borehole terminated at 3.8m, no further progress below. Deposits too dense. Borehole collapsed below 1.2m. Water present within borehole on 1.1m after completion. Poor core recovery between 1.0m and 3.0m (approx. 50%).

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Borehole Log

Borehole No. **WS3**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.15	ES					Brown slightly clayey gravelly sand MADE GROUND. Gravel is fine to coarse sub angular to sub rounded flint.
		0.30	ES					
					0.40			
		0.50	ES					Firm to stiff brown mottled orange slightly silty CLAY with rare black organic speckling.
								Hand Pen at 0.7m =170kPa
								Becoming sandy CLAY below 0.9m. Sand is fine to medium-fine grained
		1.00	D					
		1.00		N=7 (0,1/1,2,2,2)				*Hand Pen at 1.1m =50kPa*
								Occasional gravel noted below 1.15m. Gravel is fine to medium coarse angular to sub rounded flint and siltstone
								Hand Pen at 1.6m =110kPa
								Becoming more gravelly below 1.7m
		2.00	D					
		2.00		N=9 (2,2/2,2,2,3)				*Hand Pen at 2.1m =120kPa*
								Becoming moist silty very gravelly very sandy CLAY below 2.5m
					2.70			Very dense orange and yellow slightly silty SAND.
		2.90	D					*Becoming light yellow and white at 2.9m*
		3.00		N=51 (6,6/7,11,12,21)	3.00			End of borehole at 3.00 m

Remarks
Borehole terminated at 3.0m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 0.5m.

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Borehole Log

Borehole No. **WS4**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.07	ES		0.10			Dark yellow medium to coarse sand MADE GROUND with occasional gravel of fine to medium sub angular flint.
								Firm dark grey silty CLAY.
								Black plastic membrane
		0.55	ES		0.60			Firm to stiff orange mottled light brown silty CLAY with occasional black organic staining and speckling.
								Hand Pen at 0.7m =130kPa
		0.90	D					*Becoming sandy silty CLAY below 0.8m. Sand is fine to medium-fine grained.*
		1.00		N=6 (1,2/1,2,1,2)				
								Hand Pen at 1.2m =120kPa
								Becoming sandier below 1.3m
								Becoming more clayey below 1.5m
								Becoming gravelly below 1.7m. Gravel is fine to coarse angular to sub rounded siltstone and flint.
								Hand Pen at 1.8m =160kPa
		1.90	D					*Becoming very gravelly below 1.90m*
		2.00		N=4 (1,1/1,1,1,1)				
								Hand Pen at 2.3m =95kPa
					2.70			Loose orange slightly gravelly silty clayey fine to medium grained SAND
		3.00	D					
		3.00		N=9 (1,1/1,2,2,4)				
								Becoming yellow and white below 3.3m
		3.50		112 (12,19/112 for 150mm)	3.50			End of borehole at 3.50 m

Remarks
Borehole terminated at 3.5m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 0.5m.

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Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.05	ES					Light brown and dark orange gravelly clayey sand MADE GROUND. Gravel is fine to coarse sub angular to sub rounded flint, concrete, brick.	
					0.15			Layer of cobbles of off white sub angular sandstone. MADE GROUND.	
					0.30			Stiff dark grey silty CLAY with rare fragments of fine fibrous organic matter and black organic staining. Rare gravel of medium to coarse siltstone is present.	
		0.50	D					*Hand Pen at 0.4m =350kPa*	
					0.60			Soft orange mottled pale brown slightly sandy silty CLAY. Sand is fine to medium grained.	
								Hand Pen at 0.8m =110kPa	
		1.00		N=7 (2,1/1,2,2,2)				*Occasional gravel noted below 1.0m. Gravel is fine to medium angular to sub rounded siltstone and flint.*	1
								Hand Pen at 1.3m =85kPa	
								Hand Pen at 1.8m =45kPa	
								Becoming gravelly between 1.9m and 2.1m	
		2.00		N=2 (0,0/1,0,1,0)					2
								No gravel noted between 2.1m and 2.3m	
								Hand Pen at 2.2m =30kPa	
								Becoming gravelly below 2.4m	
								Hand Pen at 2.7m =40kPa	
								Becoming sandier between 2.9m and 3.0m	
		3.00		N=25 (2,5/5,5,5,10)				*Becoming more clayey below 3.0m*	3
								Hand Pen at 3.1m =20kPa	
					3.50			Medium dense dark yellow slightly silty slightly clayey medium grained SAND.	
					3.60			Medium dense pale yellow and white medium to coarse grained SAND.	
		4.00	D		4.00			Continued on next sheet	4

Remarks
Borehole terminated at 4.0m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 0.5m.

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Borehole Log

Borehole No. **WS5**
Sheet 2 of 2

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		4.00		62 (8,12/62 for 225mm)				End of borehole at 4.00 m

Remarks
Borehole terminated at 4.0m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 0.5m.

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Borehole Log

Borehole No. **WS6**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By PC

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	ES		0.10			Pale yellow coarse grained sand MADE GROUND. Plastic membrane at base. Firm brown sandy CLAY.
					0.40			Soft orange/brown very sandy CLAY.
G		1.00 1.00 1.10	D ES	N=6 (0,0/1,1,2,2)				*Hand Pen at 0.8m =90kPa*
					1.60			Firm orange/brown slightly sandy gravelly CLAY. Gravel is medium rounded siltstone. *Hand Pen at 1.6m =75kPa*
		2.00 2.00	D	N=8 (2,2/2,2,2,2)				
					2.30			Very dense orange/brown medium grained SAND.
		2.70 2.70	D	N=72 (8,10/15,17,19,21)	2.70			End of borehole at 2.70 m

Remarks
Borehole terminated at 2.7m, dry and stable; no further progress below. Deposits too dense.

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Borehole Log

Borehole No. **WS7**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By PC

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15	ES		0.20			Grass over grey/brown silty TOPSOIL.
								Soft orange/brown silty CLAY with occasional fine roots and rootlets
					0.80			Soft orange/brown very sandy CLAY. *Wet on surface*
		1.00 1.00	D	N=3 (0,0/0,0,0,3)				
								Hand Pen at 1.5m =50kPa
		1.70	D		1.80			Dense to very dense pale orange fine to medium grained SAND,
		2.00		N=31 (6,7/8,7,8,8)				
		2.50		54 (14,9/54 for 150mm)				
		2.70	D		2.70			End of borehole at 2.70 m

Remarks
Borehole terminated at 2.7m, dry and stable; no further progress below. Deposits too dense.

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Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 29/08/2017 - 29/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES					Red/light brown slightly clayey very gravelly sand MADE GROUND. Gravel is fine to coarse angular to sub rounded flint and brick
		0.25	ES					*Becoming dark yellow/brown with occasional cobbles of sub angular to sub rounded siltstone below 0.15m*
					0.30			Soft grey slightly mottled pale red sandy CLAY with occasional black organic speckling and rare gravel of fine angular to sub rounded flint.
					0.60			Loose/firm orange/dark yellow mottled pale grey/ brown very clayey SAND/soft sandy CLAY with rare gravel of fine sub angular flint.
								Becoming slightly more clayey with depth
		1.00 1.00 1.00	D ES	N=8 (0,0/2,2,2,2)				
								Hand Pen at 1.3m =75kPa
								Occasional gravel of fine to coarse angular to sub rounded flint below 1.7m noted
								Hand Pen at 1.8m =70kPa
					1.90			Soft/loose pale orange/brown gravelly silty CLAY. Gravel is fine to coarse angular to sub rounded flint.
	▼	2.00 2.00	D	N=1 (0,0/0,0,1,0)				*Becoming gravelly below 2.0m*
								Slight water seepage encountered at 2.05m
					2.50			Very dense laminated yellow and white fine to medium grained SAND.
		2.90		78 (3,10/78 for 150mm)				
		3.00	D		3.00			End of borehole at 3.00 m

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Remarks

Borehole terminated at 3.0m, stable; no further progress below. Deposits too dense. Borehole hand dug to 1.2m. Water strike encountered at 2.05m. Soakage test undertaken at 3.0m.

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Borehole Log

Borehole No. **WS9**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 30/08/2017 - 30/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.08			Dark yellow medium to coarse sand MADE GROUND with occasional gravel of fine to medium-fine sub angular flint.
		0.25	ES		0.19			Firm dark grey silty CLAY.
								Firm orange mottled grey slightly silty slightly sandy CLAY with occasional black organic staining and speckling and fragments of fine to medium tabular organic matter. Sand is fine to medium grained.
								Hand Pen at 0.5m =120kPa
		0.85	D					
		1.00		N=8 (0,0/1,2,2,3)				*Becoming mottled light grey and sandier at 1.0m*
								Hand Pen at 1.1m =50kPa
								Hand Pen at 1.5m =85kPa
		1.65	D		1.60			Firm orange with occasional light grey mottling silty very sandy CLAY.
								Becoming slightly silty and gravelly. Gravel is fine to coarse angular to sub rounded siltstone
		2.00		N=9 (2,2/2,2,2,3)				
								Hand Pen at 2.1m =130kPa
								Hand Pen at 2.3m =130kPa
								Becoming very gravelly below 2.5m
		2.60	D					*Wet between 2.5m and 2.6m*
								Becoming sandier at 2.7m. Sand is fine to medium grained
					2.80			Dense orange/yellow slightly silty medium grained SAND.
		2.90	D					*Becoming light yellow and white at 2.9m*
		3.00		N=51 (6,6/7,11,12,21)	3.00			End of borehole at 3.00 m

Remarks
Borehole terminated at 3.0m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 0.4m. Soakage test undertaken at 3.0m.

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Borehole Log

Borehole No. **WS10**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 29/08/2017 - 29/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.05	ES					Grass over dark brown slightly clayey sand TOPSOIL with abundant roots and rootlets and rare gravel of fine angular flint.
					0.20			Firm to stiff grey mottled pale brown slightly sandy silty CLAY with occasional roots up to 1.5m.
		0.30	ES					*Hand Pen at 0.5m =80kPa*
		0.90	D					
G		1.00		N=4 (0,0/1,0,1,2)				*Becoming more clayey between 1.0m and 1.50m*
								Hand Pen at 1.4m =110kPa
								Becoming sandier below 1.5m. No roots present below 1.50m
								Rare gravel of fine to medium sub angular to sub rounded flint and siltstone.
		1.90	D					
		2.00		N=9 (0,0/2,2,2,3)				*Occasional gravel of fine to medium angular to sub rounded flint and siltstone and black organic staining noted below 2.0m*
					2.10			*Hand Pen at 2m =25kPa*
								Soft orange/brown gravelly silty sandy CLAY. Gravel is fine to coarse angular to sub rounded flint and siltstone. Sand is fine to medium-fine grained. Occasional black organic staining present.
								Hand Pen at 2.5m =50kPa
		3.00		N=42 (7,7/11,11,9,11)	3.00			Dense pale orange fine to medium grained SAND.
								Becoming laminated pale yellow/white and orange below 3.10m
		3.50	D		3.50			End of borehole at 3.50 m
		3.50		73 (10,11/73 for 150mm)				

Remarks
Borehole terminated at 3.5m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 1.2m.

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Borehole Log

Borehole No. **WS11**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 29/08/2017 - 29/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.03	ES		0.05			White fine to medium grained sand MADE GROUND with occasional rootlets and gravel of fine to medium flint and fragments of fine to medium tabular wood.
								Soft grey/dark brown slightly sandy very silty CLAY. Sand is fine to medium-fine grained.
		0.45	ES					*Black plastic membrane*
								Hand Pen at 0.6m =65kPa
					0.65			Soft to firm orange/brown mottled light grey/ brown slightly sandy slightly silty CLAY with occasional black organic speckling. Sand is fine grained.
		1.00	D					*Hand Pen at 1m =35kPa*
		1.20		N=3 (0,0/0,0,2,1)				
								Hand Pen at 1.5m =60kPa
								Hand Pen at 1.8m =90kPa
	▼							*Becoming very gravelly between 1.85m and 2.0m. Gravel is fine to medium angular to sub angular flint and siltstone*
		2.00	D					*Slight water seepage noted at 1.9m*
		2.00		N=26 (1,3/3,6,10,7)				*Becoming sandy CLAY below 2.0m. Sand is fine to medium grained*
								Hand Pen at 2.1m =20kPa
								Becoming wet and gravelly below 2.20m. Gravel is fine to medium angular to sub angular flint and siltstone
					2.50			Very dense pale yellow and white SAND.
		2.70		N=68 (4,11/19,18,14,17)				
		3.00	D		3.00			End of borehole at 3.00 m

Remarks
Borehole terminated at 3.0m, stable; no further progress below. Deposits too dense. Borehole hand dug to 1.2m. Water strike encountered at 1.9m.

AGS

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA Tel: 01306 646510 www.leapenvironmental.com	**Borehole Log**	Borehole No. **WS12** Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 29/08/2017 - 29/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES					Light grey/brown slightly clayey sand MADE GROUND with occasional gravel of fine to coarse sub angular to sub rounded flint and rare rootlets. Cobbles of angular to sub rounded concrete and ironstone noted. Light organic odour noted.	
		0.35	ES					*Becoming orange/brown more clayey with dept. Occasional rootlets present*	
					0.50			*No cobbles below 0.3m*	
								Medium dense dark orange/brown clayey fine to medium-fined grained SAND /stiff sandy CLAY with roots.	
								Tree root fragment of approximate dimensions 9x6cm noted at 0.75m.	
G		1.00 1.00	D	N=18 (1,1/3,3,6,6)				*Hand Pen at 1m =225kPa*	1
								Tree roots present at 1.1m	
								Hand Pen at 1.5m =80kPa	
					1.90			Medium dense dark orange mottled brown very gravelly clayey fine to medium-fine grained SAND. Gravel is fine to medium angular to sub rounded siltstone.	
		2.00 2.00	D	N=26 (1,2/4,7,7,8)				*Becoming more clayey below 2.0m*	2
					2.85			Dense orange brown slightly silty clayey fine to medium SAND.	
		3.00 3.00	D	N=36 (3,6/7,7,9,13)					3
					3.25			Very dense moist pale yellow and white medium grained SAND.	
		3.30		69 (15,21/69 for 225mm)				*Dark green mottling noted below 3.25m*	
								With dark orange lamination at 3.75m	
		3.85	D						
					4.00			End of borehole at 4.00 m	4

Remarks

Borehole terminated at 4.0m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 0.5m.

AGS

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Borehole Log

Borehole No. **WS13**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 29/08/2017 - 29/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10			Light grey concrete paver over pea shingle gravel MADE GROUND. Gravel is medium-fine sub angular to sub rounded flint.
		0.25	ES		0.20			Grey slightly sandy silty clay MADE GROUND.
								Black plastic membrane
		0.40	ES		0.35			Dark brown clayey sand MADE GROUND with abundant fine roots and rootlets and fragments of fine to medium tabular wood. organic odour noted.
					0.50			Dark grey sandy silty CLAY with occasional fine rootlets and black organic staining.
								Soft to firm orange/brown gravelly very sandy CLAY/very clayey SAND. Gravel is fine to coarse sub angular to sub rounded siltstone and occasional flint. Sand is fine to medium grained.
		1.00		N=5 (1,1/1,2,1,1)				
		1.20	D					*Hand Pen at 1.2m =70kPa*
		2.00		N=28 (1,3/6,7,7,8)				*Hand Pen at 2m =40kPa*
		2.10	D					*Becoming medium dense below 2.0m*
					2.40			*Hand Pen at 2.35m =130kPa*
								Very dense pale yellow and white medium grained SAND.
		3.00		N=55 (2,9/9,12,17,17)				
		3.10	D					
					3.25			End of borehole at 3.25 m

1 2 3 4

Remarks
Borehole terminated at 3.25m, dry stable; no further progress below. Deposits too dense. Borehole hand dug to 1.2m.

AGS

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Borehole Log

Borehole No. **WS14**
Sheet 1 of 1

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 29/08/2017 - 29/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.05			Light grey concrete paver over pea shingle gravel MADE GROUND. Gravel is medium-fine sub angular to sub rounded flint.
								Firm grey mottled orange/brown slightly silty CLAY.
								Black plastic membrane
								Becoming more orange and sandy below 0.4m. Sand is fine to medium grained
		0.90	D					
		1.00		N=7 (1,2/2,2,1,2)				
								Becoming more clayey and light brown mottled grey. below 1.1m
					1.70			Very dense yellow/light brown medium grained SAND with occasional clay partings.
		2.00	D					
		2.00		N=53 (4,5/9,10,16,18)	2.10			*Becoming sandier below 2.0m. Sand is fine grained and with occasional gravel of fine to medium sub rounded siltstone*
								End of borehole at 2.10 m

Remarks
Borehole terminated at 2.10m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 1.0m.

AGS

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Borehole Log

Borehole No. **WS15**
Sheet 1 of 2

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 29/08/2017 - 29/08/2017	Logged By CD

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.15	ES					Light grey/brown very gravelly sand MADE GROUND. Gravel is fine to coarse sub angular to sub rounded flint and occasional fragments of fine sub angular brick. Sand is fine to medium grained.
								Cobbles of sub angular brick at 0.15m
		0.45	ES					
					0.50			Soft grey/brown mottled orange slightly sandy silty CLAY with occasional fine rootlets and black organic speckling.
								Hand Pen at 0.6m =65kPa
		1.00 1.00	D	N=7 (2,1/1,2,2,2)				*Hand Pen at 1m =75kPa*
								Hand Pen at 1.4m =60kPa
					1.50			Loose orange gravelly clayey medium grained SAND. Gravel is fine to coarse sub angular to sub rounded flint and siltstone.
		2.00 2.00	D	N=2 (0,0/1,0,1,0)				
								Becoming brown and slightly more clayey below 2.3m
								Cobble of flint noted at 2.35m
					2.80			Medium dense pale yellow and white fine to medium grained SAND.
		3.00 3.00	D	N=25 (2,5/5,5,5,10)	3.00			End of borehole at 3.00 m
								Continued on next sheet

Remarks
Borehole terminated at 3.0m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 1.2m. Soakage test undertaken at 3.0m.

AGS

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Borehole Log

Borehole No. **WS15**
Sheet 2 of 2

Project Name: Liss Forest Nursery	Project No. LP1457	Co-ords: -	Hole Type WS
Location: Greatham, GU33 6EY		Level:	Scale 1:20
Client: Cove Homes Ltd		Dates: 29/08/2017 - 29/08/2017	Logged By CD

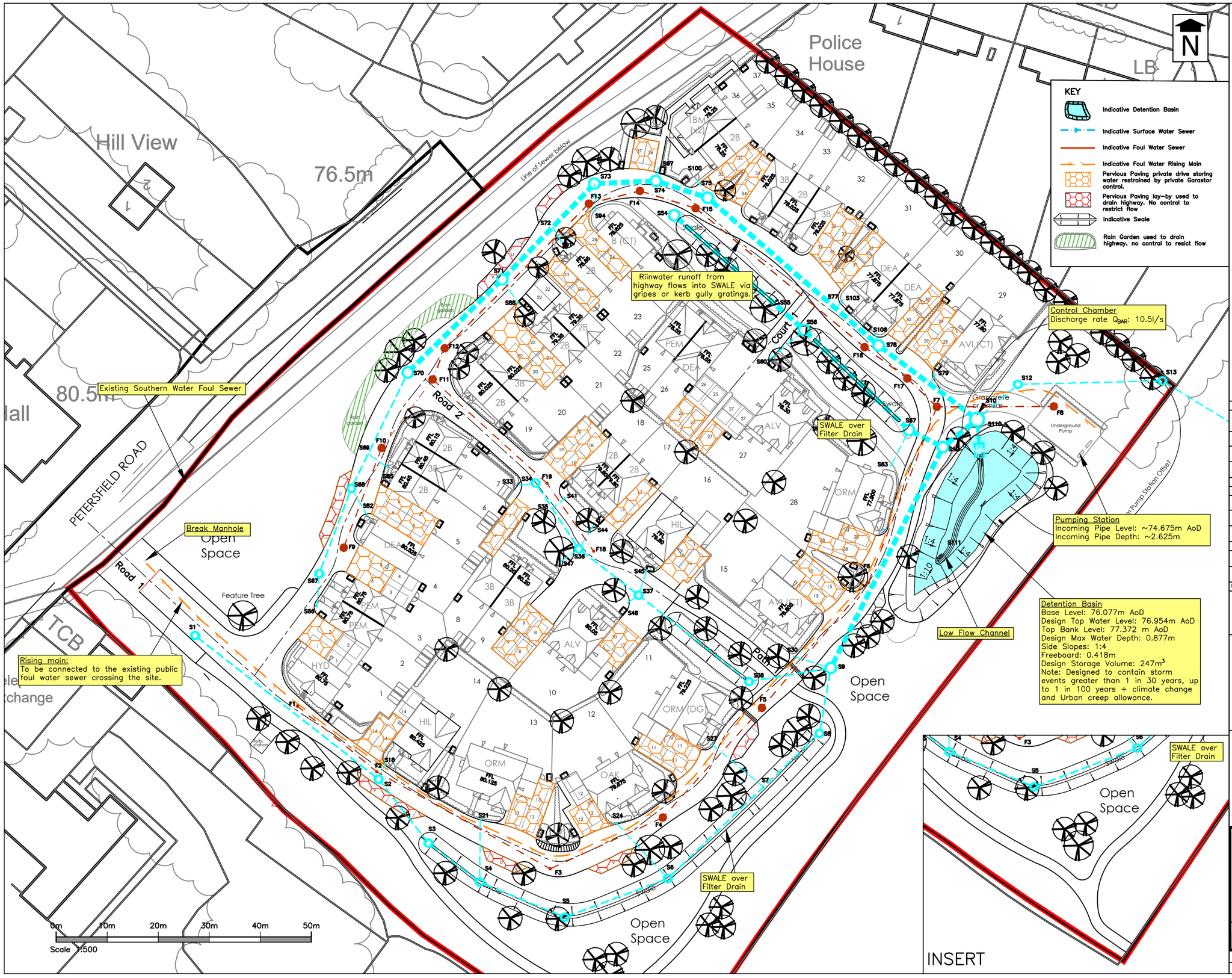
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		4.00		62 (8,12/62 for 225mm)				

5
6
7
8

Remarks
Borehole terminated at 3.0m, dry and stable; no further progress below. Deposits too dense. Borehole hand dug to 1.2m. Soakage test undertaken at 3.0m.

AGS

Appendix 6



PFA consulting

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Website
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For Planning
These drawings are produced for the purposes of supporting a planning application and should not be relied upon for tender, pricing, or construction purposes.

NOTES

1. **This drawing is based on the Topographical Survey undertaken by Encompass Surveys LTD, Drawing ref. ENC/070817/SZ3–1, dated August 2017.**
2. **Planning layout is based on Carlton design Partnership, Drawing No. 150715/SL40/01 REV Y dated September 2020.**
3. **Greenfield Runoff Rates:**
   Q_{BAR}: 8.9 l/s
   Q_{BAR}: 10.5 l/s
   (the mean annual peak rate of runoff)
4. **Drainage subject to detailed design.**
5. **Outfall arrangements, levels and location are based on additional survey undertaken by Encompass Surveys LTD, Drawing ref. ENC–240918–U5A9, dated October 2018 .**

Rev	Date	Description	Drawn	Check
#	16/08/18	First Issue.	PS	MWS
A	21/08/18	Decreased size of detention basin and added underground storage at the request of client.	PS	MWS
B	23/08/18	Changed the online underground storage to offline.	PS	MWS
C	29/08/18	Retracted to initial detention basin design and removed underground storage.	PS	MWS
D	31/10/18	Changed detention basin design and adjusted to layout REV G.	PS	MWS
E	12/11/18	Adjusted to new Layout	PS	MWS
F	20/11/18	Adjusted to comments	PS	MWS
G	18/01/18	Added Permeable Paving to private parking area for treatment	PS	BF
H	18/12/19	Changed Drainage design to Site Layout (40Units) Revision J	PS	MWS
I	19/12/19	Changed Drainage design to Site Layout (40Units) Revision K	PS	MWS
J	19/03/20	Low flow channel added to pond.	MRD	SAM
K	22/10/20	Updated Site Layout (37 Units) to Revision Y, drainage & permeable paving amended.	LK	SAM
L	29/06/21	Layout revised. Storm drainage re-designed to utilise Suds elements in the layout.	MRD	SAM

Status

FOR PLANNING

Client

Cove Construction, Peter Catt, Vincent Catt and Neill Catt

Project

Liss Forest Nursery, Greatham, Liss, Hampshire

Drawing Title

Indicative Surface Water Drainage Strategy

Drawing No. **C795/2** Rev L

Date: August 2018 | Scale: 1:500 @A2

E-Mail: pschilbach@pfaplc.com

Appendix 7

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	Soil	0.450
Area (ha)	1.730	Urban	0.000
SAAR (mm)	990	Region Number	Region 7

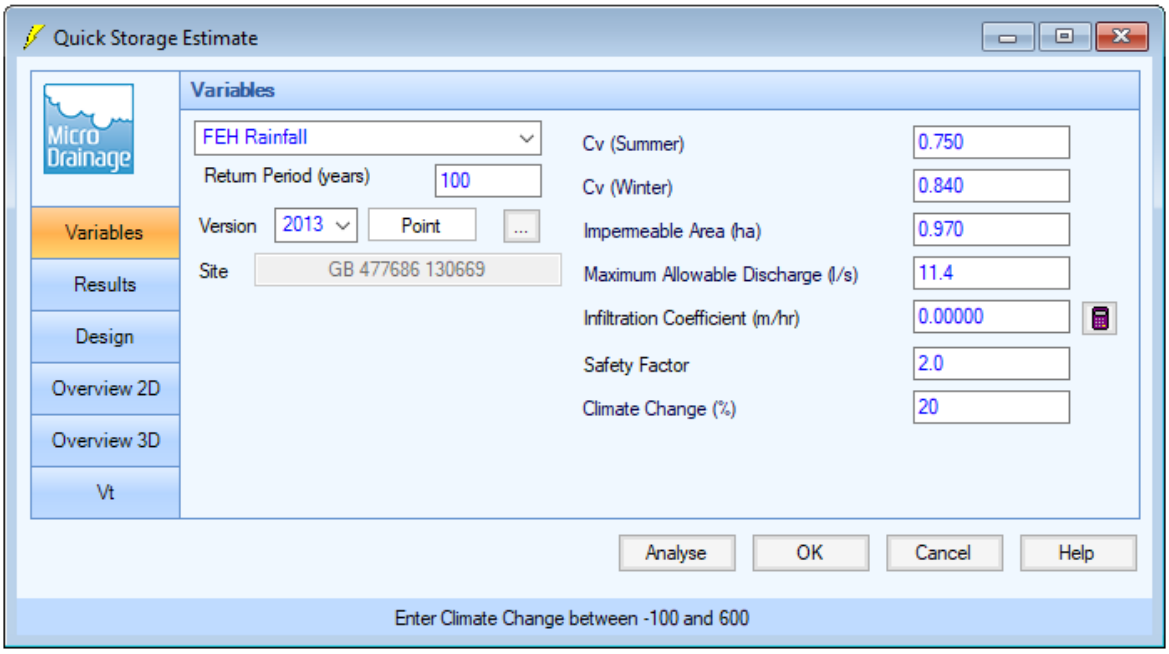
Results l/s

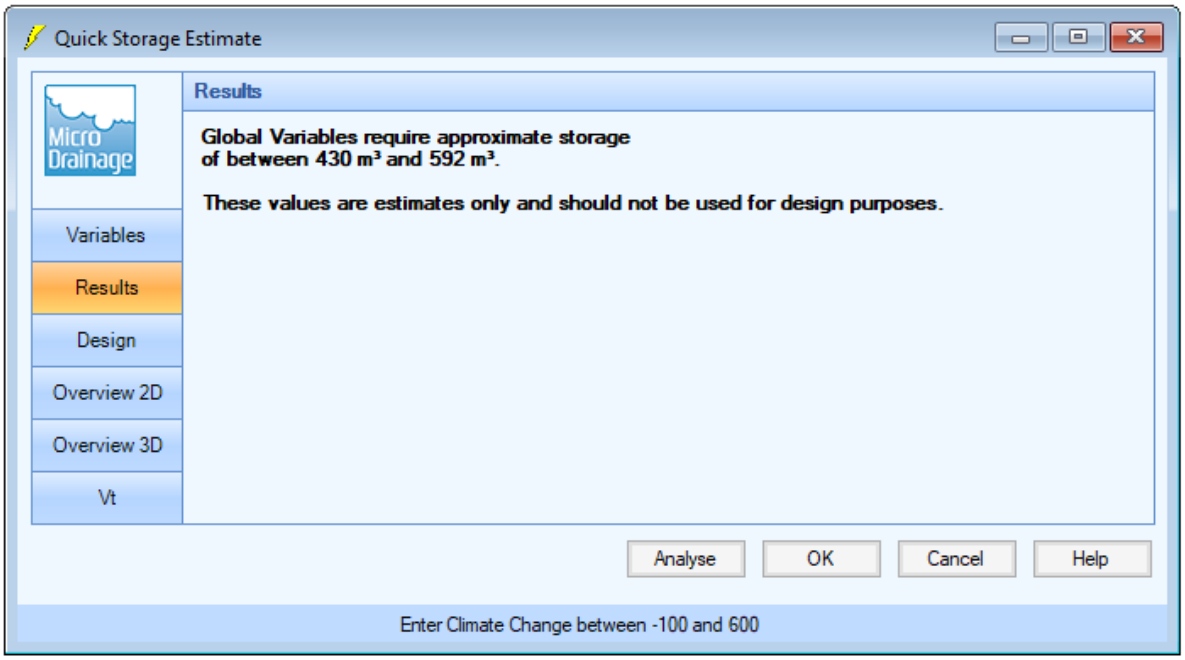
QBAR Rural	11.4
QBAR Urban	11.4
Q1 year	9.7
Q1 year	9.7
Q30 years	25.8
Q100 years	36.4

Appendix 8

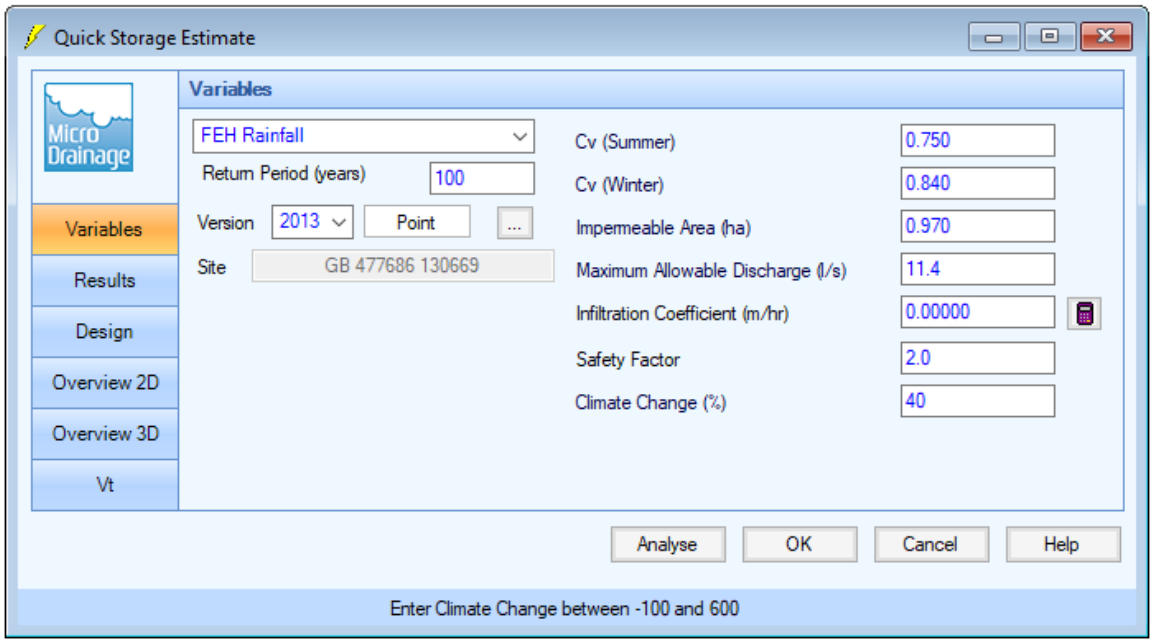
Quick Storage Estimate

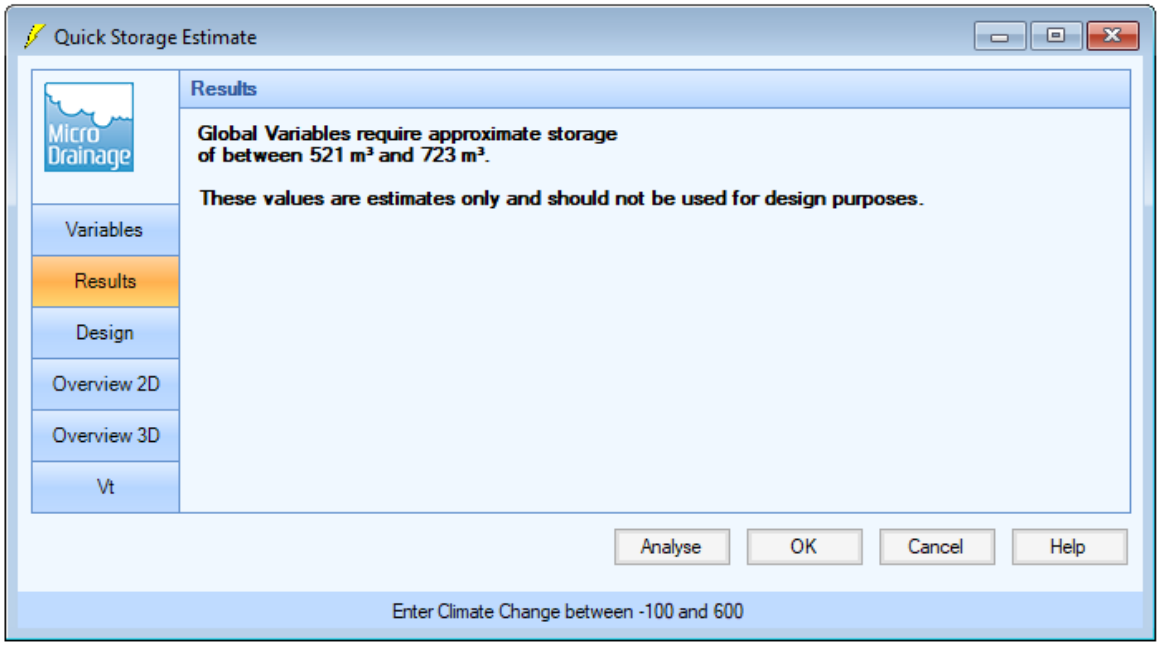
20% Climate Change





40% Climate Change





Appendix 9

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Preliminary
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NOTES

1. This drawing is based on the Topographical Survey undertaken by Encompass Surveys LTD, Drawing ref. ENC/070817/SZ3-1, dated August 2017.
2. Planning layout is based on Carlton design Partnership, Drawing No. 150715/SL40/01 REV Y dated September 2020.

KEY

Overland Flow path indicator

Rev	Date	Description	Drawn	Check
#	31/08/18	First Issue.	PS	MWS
A	12/11/18	Adjustment to new Layout	PS	MWS
B	20/11/18	Amended to comments	PS	MWS
C	17/12/19	Amended to layout 150715/SL40/01 REV J	PS	MWS
D	19/12/19	Amended to layout 150715/SL40/01 REV K	PS	MWS
E	22/10/20	Amended to layout 150715/SL40/01 REV Y	LK	SAM
F	30/06/21	Amended to layout 150715/SL40/01 REV Z6. Garden flow routes added.	MRD	SAM

Status
PRELIMINARY

Client
Cove Construction, Peter Catt, Vincent Catt and Neill Catt

Project
Liss Forest Nursery, Greatham, Liss, Hampshire

Drawing Title
Overland Flowpath

Drawing No. C795/3 Rev F

Date: October 2018 | Scale: 1:500 @A2

E-Mail: pschilbach@pfaplc.com

Appendix 10

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SNET 2.SWS

Pipe Sizes SW Export Manhole Sizes SW Export

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	10
Ratio R	0.313	Minimum Backdrop Height (m)	0.500
Maximum Rainfall (mm/hr)	550	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	975

Designed with Level Soffits

Time Area Diagram for SNET 2.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.299	8-12	0.416	12-16	0.001

Total Area Contributing (ha) = 0.716

Total Pipe Volume (m³) = 194.990

Network Design Table for SNET 2.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	45.638	0.450	101.4	0.032	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	7.971	0.165	48.3	0.017	5.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	59.26	5.59	79.450	0.032	0.0	0.0	0.5	1.30	51.6	5.6
S2.000	61.35	5.12	79.440	0.017	0.0	0.0	0.3	1.11	8.7	3.1

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.001	2.036	0.170	12.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.002	3.293	0.055	59.9	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	15.817	0.285	55.5	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	12.650	0.345	36.7	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	8.271	0.125	66.2	0.020	5.00	0.0	0.600	o	100	Pipe/Conduit	
S3.001	1.919	0.030	64.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S3.002	12.421	0.405	30.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	18.034	0.490	36.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	21.570	0.300	71.9	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	8.621	0.150	57.5	0.016	5.00	0.0	0.600	o	100	Pipe/Conduit	
S4.001	1.898	0.305	6.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S4.002	14.834	0.540	27.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.005	25.984	0.604	43.0	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	8.568	0.130	65.9	0.021	5.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.001	61.28	5.13	79.275	0.017	0.0	0.0	0.3	2.25	17.6	3.1
S2.002	61.03	5.19	79.105	0.017	0.0	0.0	0.3	1.00	7.8	3.1
S1.001	58.62	5.74	78.925	0.064	0.0	0.0	1.0	1.76	70.0	11.2
S1.002	58.22	5.83	78.715	0.077	0.0	0.0	1.2	2.17	86.2	13.4
S3.000	61.23	5.15	78.980	0.020	0.0	0.0	0.3	0.95	7.4	3.6
S3.001	61.08	5.18	78.855	0.020	0.0	0.0	0.3	0.96	7.6	3.6
S3.002	60.40	5.33	78.825	0.020	0.0	0.0	0.3	1.40	11.0	3.6
S1.003	57.65	5.97	78.295	0.097	0.0	0.0	1.5	2.16	86.0	16.7
S1.004	56.73	6.20	77.805	0.110	0.0	0.0	1.7	1.54	61.4	18.6
S4.000	61.25	5.14	78.625	0.016	0.0	0.0	0.3	1.02	8.0	2.9
S4.001	61.20	5.15	78.475	0.016	0.0	0.0	0.3	3.12	24.5	2.9
S4.002	60.44	5.32	78.170	0.016	0.0	0.0	0.3	1.48	11.6	2.9
S1.005	55.91	6.42	77.505	0.134	0.0	0.0	2.0	2.00	79.5	22.3
S5.000	61.21	5.15	78.165	0.021	0.0	0.0	0.3	0.95	7.5	3.8

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S5.001	1.984	0.100	19.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S5.002	13.029	0.909	14.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.006	15.112	0.351	43.1	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.007	12.988	0.280	46.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S6.000	13.920	0.350	39.8	0.018	5.00	0.0	0.600	o	100	Pipe/Conduit	
S6.001	2.000	0.240	8.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S6.002	7.596	0.865	8.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.000	2.298	0.034	67.6	0.012	5.00	0.0	0.600	o	100	Pipe/Conduit	
S7.001	2.855	0.440	6.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.002	3.000	0.051	58.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.003	6.028	0.075	80.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.000	2.382	0.085	28.0	0.012	5.00	0.0	0.600	o	100	Pipe/Conduit	
S8.001	3.472	0.200	17.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S8.002	3.337	0.055	60.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.004	9.405	0.170	55.3	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S5.001	61.12	5.17	78.035	0.021	0.0	0.0	0.3	1.74	13.7	3.8
S5.002	60.63	5.28	77.935	0.021	0.0	0.0	0.3	2.05	16.1	3.8
S1.006	55.44	6.55	76.901	0.166	0.0	0.0	2.5	2.00	79.5	27.4
S1.007	55.04	6.66	76.550	0.166	0.0	0.0	2.5	1.93	76.6	27.4
S6.000	61.03	5.19	77.850	0.018	0.0	0.0	0.3	1.23	9.6	3.3
S6.001	60.97	5.20	77.500	0.018	0.0	0.0	0.3	2.69	21.2	3.3
S6.002	60.75	5.25	77.260	0.018	0.0	0.0	0.3	2.62	20.6	3.3
S7.000	61.72	5.04	79.000	0.012	0.0	0.0	0.2	0.94	7.4	2.2
S7.001	61.65	5.06	78.966	0.012	0.0	0.0	0.2	3.06	24.0	2.2
S7.002	61.42	5.11	78.526	0.012	0.0	0.0	0.2	1.01	7.9	2.2
S7.003	61.09	5.17	78.350	0.012	0.0	0.0	0.2	1.46	58.0	2.2
S8.000	61.79	5.03	78.750	0.012	0.0	0.0	0.2	1.46	11.5	2.2
S8.001	61.64	5.06	78.665	0.012	0.0	0.0	0.2	1.86	14.6	2.2
S8.002	61.38	5.11	78.455	0.012	0.0	0.0	0.2	0.99	7.8	2.2
S7.004	60.69	5.26	78.275	0.033	0.0	0.0	0.5	1.76	70.1	6.0

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S9.000	2.424	0.050	48.5	0.009	5.00	0.0	0.600	o	100	Pipe/Conduit	
S9.001	3.115	0.270	11.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S9.002	5.294	0.200	26.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S10.000	10.562	0.065	162.5	0.019	5.00	0.0	0.600	o	100	Pipe/Conduit	
S10.001	2.597	0.455	5.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S10.002	4.138	0.200	20.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.005	14.786	0.150	98.6	0.014	0.00	0.0	0.600	o	225	Pipe/Conduit	
S11.000	5.902	0.045	131.2	0.017	5.00	0.0	0.600	o	100	Pipe/Conduit	
S11.001	2.111	0.375	5.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S11.002	5.162	0.250	20.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S12.000	5.815	0.060	96.9	0.016	5.00	0.0	0.600	o	100	Pipe/Conduit	
S12.001	2.137	0.660	3.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S12.002	2.480	0.200	12.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.006	27.456	0.350	78.4	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S9.000	61.75	5.04	78.750	0.009	0.0	0.0	0.2	1.11	8.7	1.7
S9.001	61.64	5.06	78.700	0.009	0.0	0.0	0.2	2.29	18.0	1.7
S9.002	61.36	5.12	78.430	0.009	0.0	0.0	0.2	1.51	11.8	1.7
S10.000	60.55	5.29	78.950	0.019	0.0	0.0	0.3	0.60	4.7	3.4
S10.001	60.49	5.31	78.885	0.019	0.0	0.0	0.3	3.26	25.6	3.4
S10.002	60.31	5.35	78.430	0.019	0.0	0.0	0.3	1.71	13.4	3.4
S7.005	59.48	5.53	78.105	0.075	0.0	0.0	1.2	1.32	52.4	13.3
S11.000	61.23	5.15	78.750	0.017	0.0	0.0	0.3	0.67	5.3	3.1
S11.001	61.18	5.16	78.705	0.017	0.0	0.0	0.3	3.28	25.8	3.1
S11.002	60.94	5.21	78.330	0.017	0.0	0.0	0.3	1.71	13.4	3.1
S12.000	61.33	5.12	79.000	0.016	0.0	0.0	0.3	0.78	6.1	2.9
S12.001	61.29	5.13	78.940	0.016	0.0	0.0	0.3	4.33	34.0	2.9
S12.002	61.21	5.15	78.280	0.016	0.0	0.0	0.3	2.21	17.3	2.9
S7.006	58.17	5.84	77.955	0.123	0.0	0.0	1.9	1.48	58.8	21.3

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S7.007	16.235	1.335	12.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.008	48.502	0.230	210.9	0.029	0.00	0.0	0.600	o	900	Pipe/Conduit	
S13.000	27.537	0.110	250.3	0.026	5.00	0.0	0.600	o	900	Pipe/Conduit	
S13.001	6.337	0.100	63.4	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S14.000	5.664	0.240	23.6	0.047	5.00	0.0	0.600	o	150	Pipe/Conduit	
S14.001	12.489	0.145	86.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S14.002	8.741	0.430	20.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S13.002	28.365	0.230	123.3	0.025	0.00	0.0	0.600	o	900	Pipe/Conduit	
S15.000	2.753	0.120	22.9	0.020	5.00	0.0	0.600	o	100	Pipe/Conduit	
S15.001	12.755	0.225	56.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S15.002	7.792	0.051	152.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S13.003	7.423	0.150	49.5	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S1.009	8.598	0.025	343.9	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S7.007	57.79	5.94	77.605	0.123	0.0	0.0	1.9	2.91	51.3	21.3
S1.008	53.73	7.04	75.595	0.336	0.0	0.0	4.9	2.15	1370.2	53.8
S13.000	60.83	5.23	75.925	0.026	0.0	0.0	0.4	1.98	1257.0	4.7
S13.001	60.71	5.26	75.815	0.026	0.0	0.0	0.4	3.94	2506.4	4.7
S14.000	61.70	5.05	77.280	0.047	0.0	0.0	0.8	2.08	36.8	8.6
S14.001	60.81	5.24	77.040	0.047	0.0	0.0	0.8	1.08	19.1	8.6
S14.002	60.51	5.30	76.895	0.047	0.0	0.0	0.8	2.24	39.7	8.6
S13.002	59.76	5.47	75.715	0.098	0.0	0.0	1.6	2.82	1794.3	17.4
S15.000	61.78	5.03	76.850	0.020	0.0	0.0	0.3	1.62	12.7	3.7
S15.001	60.81	5.24	76.730	0.020	0.0	0.0	0.3	1.03	8.1	3.7
S15.002	59.87	5.45	76.505	0.020	0.0	0.0	0.3	0.62	4.9	3.7
S13.003	59.64	5.50	75.485	0.118	0.0	0.0	1.9	4.46	2837.3	21.0
S1.009	53.44	7.12	75.360	0.454	0.0	0.0	6.6	1.68	1071.2	72.3

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S16.000	3.468	0.065	53.4	0.022	5.00	0.0	0.600	o	100	Pipe/Conduit	
S16.001	1.958	0.280	7.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.002	6.508	0.070	93.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.003	17.833	0.160	111.5	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
S17.000	3.601	0.040	90.0	0.014	5.00	0.0	0.600	o	100	Pipe/Conduit	
S17.001	3.441	0.465	7.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S17.002	5.994	0.145	41.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.004	7.640	0.095	80.4	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
S18.000	2.810	0.050	56.2	0.018	5.00	0.0	0.600	o	100	Pipe/Conduit	
S18.001	2.405	0.170	14.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S18.002	4.784	0.225	21.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.005	17.916	1.955	9.2	0.010	0.00	0.0	0.600	o	225	Pipe/Conduit	
S16.006	25.964	0.155	167.4	0.018	0.00	0.0	0.600	o	900	Pipe/Conduit	
S19.000	2.118	0.160	13.2	0.023	5.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S16.000	61.66	5.05	79.625	0.022	0.0	0.0	0.4	1.06	8.3	4.0
S16.001	61.61	5.07	79.560	0.022	0.0	0.0	0.4	2.94	23.1	4.0
S16.002	60.97	5.20	79.280	0.022	0.0	0.0	0.4	0.80	6.3	4.0
S16.003	59.89	5.44	79.085	0.037	0.0	0.0	0.6	1.24	49.2	6.6
S17.000	61.57	5.07	79.700	0.014	0.0	0.0	0.2	0.81	6.4	2.6
S17.001	61.47	5.09	79.660	0.014	0.0	0.0	0.2	2.86	22.5	2.6
S17.002	61.08	5.18	79.195	0.014	0.0	0.0	0.2	1.20	9.4	2.6
S16.004	59.50	5.53	78.925	0.060	0.0	0.0	1.0	1.46	58.0	10.6
S18.000	61.70	5.05	79.400	0.018	0.0	0.0	0.3	1.03	8.1	3.3
S18.001	61.61	5.06	79.350	0.018	0.0	0.0	0.3	2.06	16.2	3.3
S18.002	61.39	5.11	79.180	0.018	0.0	0.0	0.3	1.68	13.2	3.3
S16.005	59.21	5.60	78.830	0.088	0.0	0.0	1.4	4.35	172.9	15.5
S16.006	58.45	5.78	76.200	0.106	0.0	0.0	1.7	2.42	1538.9	18.5
S19.000	61.84	5.02	78.300	0.023	0.0	0.0	0.4	2.14	16.8	4.2

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S19.001	4.023	0.415	9.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S19.002	5.805	0.880	6.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.007	14.121	0.085	166.1	0.012	0.00	0.0	0.600	o	900	Pipe/Conduit	
S20.000	4.270	0.100	42.7	0.014	5.00	0.0	0.600	o	100	Pipe/Conduit	
S20.001	2.299	0.850	2.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S20.002	3.204	0.290	11.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.008	11.814	0.070	168.8	0.004	0.00	0.0	0.600	o	900	Pipe/Conduit	
S21.000	3.227	0.060	53.8	0.014	5.00	0.0	0.600	o	100	Pipe/Conduit	
S21.001	1.871	0.810	2.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S21.002	5.496	0.115	47.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.009	12.062	0.070	172.3	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S22.000	3.481	0.040	87.0	0.009	5.00	0.0	0.600	o	100	Pipe/Conduit	
S22.001	4.136	0.165	25.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S22.002	2.545	0.325	7.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S19.001	61.71	5.04	78.140	0.023	0.0	0.0	0.4	2.50	19.6	4.2
S19.002	61.56	5.08	77.725	0.023	0.0	0.0	0.4	3.03	23.8	4.2
S16.007	58.05	5.87	76.045	0.141	0.0	0.0	2.2	2.43	1544.8	24.4
S20.000	61.63	5.06	78.000	0.014	0.0	0.0	0.2	1.18	9.3	2.6
S20.001	61.59	5.07	77.900	0.014	0.0	0.0	0.2	4.74	37.2	2.6
S20.002	61.49	5.09	77.050	0.014	0.0	0.0	0.2	2.34	18.4	2.6
S16.008	57.72	5.96	75.960	0.159	0.0	0.0	2.5	2.41	1532.6	27.3
S21.000	61.68	5.05	77.675	0.014	0.0	0.0	0.2	1.05	8.3	2.6
S21.001	61.65	5.06	77.615	0.014	0.0	0.0	0.2	5.13	40.3	2.6
S21.002	61.26	5.14	76.805	0.014	0.0	0.0	0.2	1.12	8.8	2.6
S16.009	57.38	6.04	75.890	0.173	0.0	0.0	2.7	2.38	1516.7	29.6
S22.000	61.58	5.07	77.150	0.009	0.0	0.0	0.2	0.83	6.5	1.7
S22.001	61.37	5.11	77.110	0.009	0.0	0.0	0.2	1.55	12.2	1.7
S22.002	61.30	5.13	76.945	0.009	0.0	0.0	0.2	2.78	21.8	1.7

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S16.010	10.660	0.065	164.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S23.000	3.134	0.045	69.6	0.025	5.00	0.0	0.600	o	100	Pipe/Conduit	
S23.001	2.404	0.215	11.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S23.002	3.935	0.335	11.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.011	33.083	0.200	165.4	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S24.000	2.188	0.045	48.6	0.026	5.00	0.0	0.600	o	100	Pipe/Conduit	
S24.001	2.039	0.650	3.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S24.002	2.072	0.175	11.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.012	11.153	0.070	159.3	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S25.000	2.683	0.040	67.1	0.011	5.00	0.0	0.600	o	100	Pipe/Conduit	
S25.001	2.105	0.755	2.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S25.002	2.297	0.145	15.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.013	12.387	0.075	165.2	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S16.010	57.09	6.11	75.820	0.182	0.0	0.0	2.8	2.44	1554.9	31.0
S23.000	61.65	5.06	77.150	0.025	0.0	0.0	0.4	0.92	7.3	4.6
S23.001	61.57	5.07	77.105	0.025	0.0	0.0	0.4	2.32	18.3	4.6
S23.002	61.43	5.10	76.890	0.025	0.0	0.0	0.4	2.27	17.8	4.6
S16.011	56.22	6.34	75.755	0.207	0.0	0.0	3.2	2.43	1548.2	34.7
S24.000	61.76	5.03	77.225	0.026	0.0	0.0	0.4	1.11	8.7	4.8
S24.001	61.73	5.04	77.180	0.026	0.0	0.0	0.4	4.40	34.6	4.8
S24.002	61.65	5.06	76.530	0.026	0.0	0.0	0.4	2.26	17.7	4.8
S16.012	55.94	6.41	75.555	0.233	0.0	0.0	3.5	2.48	1577.6	38.8
S25.000	61.69	5.05	77.225	0.011	0.0	0.0	0.2	0.94	7.4	2.0
S25.001	61.66	5.06	77.185	0.011	0.0	0.0	0.2	4.67	36.7	2.0
S25.002	61.56	5.07	76.430	0.011	0.0	0.0	0.2	1.95	15.3	2.0
S16.013	55.62	6.50	75.485	0.244	0.0	0.0	3.7	2.44	1549.4	40.4

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S26.000	6.401	0.050	128.0	0.018	5.00	0.0	0.600	o	100	Pipe/Conduit	
S26.001	2.052	0.785	2.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S26.002	2.118	0.105	20.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.014	11.742	0.070	167.7	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S27.000	24.513	0.050	490.3	0.000	5.00	0.0	0.600	\/	-1	Pipe/Conduit	
S27.001	4.619	0.542	8.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.010	10.554	0.075	140.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.011	28.293	0.190	148.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.012	255.101	3.010	84.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.013	31.065	0.450	69.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S26.000	61.18	5.16	77.150	0.018	0.0	0.0	0.3	0.68	5.3	3.3
S26.001	61.14	5.16	77.100	0.018	0.0	0.0	0.3	4.82	37.9	3.3
S26.002	61.05	5.18	76.315	0.018	0.0	0.0	0.3	1.73	13.6	3.3
S16.014	55.33	6.58	75.410	0.262	0.0	0.0	3.9	2.42	1537.3	43.2
S27.000	51.84	7.62	75.927	0.000	0.0	0.0	0.0	0.16	15.5	0.0
S27.001	51.81	7.62	75.877	0.000	0.0	0.0	0.0	8.37	2367.7	0.0
S1.010	51.18	7.83	75.185	0.716	0.0	0.0	9.9	0.85	14.9«	109.2
S1.011	49.52	8.41	75.110	0.716	0.0	0.0	9.9	0.82	14.5«	109.2
S1.012	41.01	12.30	74.920	0.716	0.0	0.0	9.9	1.09	19.3«	109.2
S1.013	40.30	12.73	71.910	0.716	0.0	0.0	9.9	1.21	21.4«	109.2

Conduit Sections for SNET 2.SWS

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m²)
-1	\/	300	150	22.5		0.033	0.099

Free Flowing Outfall Details for SNET 2.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.013	S15	73.000	71.460	71.460	0	0

Simulation Criteria for SNET 2.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	32
Number of Online Controls	22	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.313		

Online Controls for SNET 2.SWS

Garastor Manhole: SP17, DS/PN: S2.001, Volume (m³): 0.3

Invert Level (m) 79.275 Model 300mm Overflow

Garastor Manhole: SP20, DS/PN: S3.001, Volume (m³): 0.3

Invert Level (m) 78.855 Model 300mm Overflow

Garastor Manhole: SP23, DS/PN: S4.001, Volume (m³): 0.3

Invert Level (m) 78.475 Model 300mm Overflow

Garastor Manhole: SP26, DS/PN: S5.001, Volume (m³): 0.3

Invert Level (m) 78.035 Model 300mm Overflow

Garastor Manhole: SP29, DS/PN: S6.001, Volume (m³): 0.3

Invert Level (m) 77.500 Model 300mm Overflow

Garastor Manhole: SP32, DS/PN: S7.001, Volume (m³): 0.2

Invert Level (m) 78.966 Model 300mm Overflow

Garastor Manhole: SP40, DS/PN: S8.001, Volume (m³): 0.2

Invert Level (m) 78.665 Model 300mm Overflow

Garastor Manhole: SP43, DS/PN: S9.001, Volume (m³): 0.2

Invert Level (m) 78.700 Model 300mm Overflow

Garastor Manhole: SP46, DS/PN: S10.001, Volume (m³): 0.3

Invert Level (m) 78.885 Model 300mm Overflow

Garastor Manhole: SP44, DS/PN: S11.001, Volume (m³): 0.2

Invert Level (m) 78.705 Model 300mm Overflow

Garastor Manhole: SP46, DS/PN: S12.001, Volume (m³): 0.2

Invert Level (m) 78.940 Model 300mm Overflow

Garastor Manhole: S62, DS/PN: S15.001, Volume (m³): 0.2

Invert Level (m) 76.730 Model 300mm Overflow

Garastor Manhole: SP65, DS/PN: S16.001, Volume (m³): 0.2

Invert Level (m) 79.560 Model 300mm Overflow

Garastor Manhole: SP90, DS/PN: S20.001, Volume (m³): 0.2

Invert Level (m) 77.900 Model 300mm Overflow

Garastor Manhole: SP93, DS/PN: S21.001, Volume (m³): 0.2

Invert Level (m) 77.615 Model 300mm Overflow

Garastor Manhole: SP96, DS/PN: S22.001, Volume (m³): 0.2

Invert Level (m) 77.110 Model 300mm Overflow

Garastor Manhole: SP99, DS/PN: S23.001, Volume (m³): 0.2

Invert Level (m) 77.105 Model 300mm Overflow

Garastor Manhole: SP102, DS/PN: S24.001, Volume (m³): 0.1

Invert Level (m) 77.180 Model 300mm Overflow

Garastor Manhole: SP105, DS/PN: S25.001, Volume (m³): 0.1

Invert Level (m) 77.185 Model 300mm Overflow

Garastor Manhole: SP108, DS/PN: S26.001, Volume (m³): 0.1

Invert Level (m) 77.100 Model 300mm Overflow

Non Return Valve Manhole: S111, DS/PN: S27.001, Volume (m³): 2.4

Crown Vortex Valve® Manhole: S10, DS/PN: S1.010, Volume (m³): 22.5

Design Head (m) 1.850 Vortex Valve® Type R1 SW Only Invert Level (m) 75.185
Design Flow (l/s) 10.5 Diameter (mm) 114

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.9	1.200	8.4	3.000	13.3	7.000	20.3
0.200	4.0	1.400	9.1	3.500	14.4	7.500	21.0
0.300	4.2	1.600	9.7	4.000	15.4	8.000	21.7
0.400	4.9	1.800	10.3	4.500	16.3	8.500	22.4
0.500	5.4	2.000	10.9	5.000	17.2	9.000	23.1
0.600	6.0	2.200	11.4	5.500	18.0	9.500	23.7
0.800	6.9	2.400	11.9	6.000	18.8		
1.000	7.7	2.600	12.4	6.500	19.6		

Offline Controls for SNET 2.SWS

Weir Manhole: S10, DS/PN: S1.010, Loop to PN: S27.001

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 76.950

Storage Structures for SNET 2.SWS

Porous Car Park Manhole: SP17, DS/PN: S2.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.7
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.800	Membrane Depth (mm)	0

Complex Manhole: S3, DS/PN: S1.002

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	12.7
Safety Factor	2.0	Slope (1:X)	36.7
Porosity	0.30	Cap Volume Depth (m)	0.979
Invert Level (m)	78.715	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	12.7
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	36.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	79.694	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Porous Car Park Manhole: SP20, DS/PN: S3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	12.3
Max Percolation (l/s)	16.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.500	Membrane Depth (mm)	0

Complex Manhole: S4, DS/PN: S1.003

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	18.0
Safety Factor	2.0	Slope (1:X)	36.8
Porosity	0.30	Cap Volume Depth (m)	1.136
Invert Level (m)	78.370	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	18.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	36.8
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	79.506	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: S5, DS/PN: S1.004

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	21.6
Safety Factor	2.0	Slope (1:X)	71.9
Porosity	0.30	Cap Volume Depth (m)	1.318
Invert Level (m)	77.880	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	21.6
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	71.9
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	79.198	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Porous Car Park Manhole: SP23, DS/PN: S4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.0
Membrane Percolation (mm/hr)	1000	Length (m)	8.0
Max Percolation (l/s)	8.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.140	Membrane Depth (mm)	0

Complex Manhole: S6, DS/PN: S1.005

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	22.0
Safety Factor	2.0	Slope (1:X)	63.4
Porosity	0.30	Cap Volume Depth (m)	1.304
Invert Level (m)	77.580	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	26.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	63.4
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	78.884	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Porous Car Park Manhole: SP26, DS/PN: S5.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	8.0
Membrane Percolation (mm/hr)	1000	Length (m)	8.0
Max Percolation (l/s)	17.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	78.725	Membrane Depth (mm)	0

Complex Manhole: S7, DS/PN: S1.006

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	15.1
Safety Factor	2.0	Slope (1:X)	25.6
Porosity	0.30	Cap Volume Depth (m)	1.335
Invert Level (m)	77.095	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	15.1
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	25.6
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	77.095	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Porous Car Park Manhole: SP29, DS/PN: S6.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.9
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	16.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.580	Membrane Depth (mm)	0

Porous Car Park Manhole: SP32, DS/PN: S7.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	13.0
Max Percolation (l/s)	10.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.565	Membrane Depth (mm)	0

Porous Car Park Manhole: SP40, DS/PN: S8.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	19.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.195	Membrane Depth (mm)	0

Porous Car Park Manhole: SP42, DS/PN: S9.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.8
Membrane Percolation (mm/hr)	1000	Length (m)	12.1
Max Percolation (l/s)	12.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.165	Membrane Depth (mm)	0

Porous Car Park Manhole: SP46, DS/PN: S10.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.5
Membrane Percolation (mm/hr)	1000	Length (m)	11.8
Max Percolation (l/s)	21.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.375	Membrane Depth (mm)	0

Porous Car Park Manhole: SP44, DS/PN: S11.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.7
Membrane Percolation (mm/hr)	1000	Length (m)	10.1
Max Percolation (l/s)	13.2	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.185	Membrane Depth (mm)	0

Porous Car Park Manhole: SP46, DS/PN: S12.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	11.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.340	Membrane Depth (mm)	0

Complex Manhole: S37, DS/PN: S7.006

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	27.5
Safety Factor	2.0	Slope (1:X)	99.8
Porosity	0.30	Cap Volume Depth (m)	0.936
Invert Level (m)	78.100	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	27.5
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	99.8
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	79.111	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S54, DS/PN: S13.000

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.5
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	25.6
Safety Factor	2.0	Slope (1:X)	250.0
Porosity	0.30	Cap Volume Depth (m)	1.480
Invert Level (m)	77.270	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	25.6
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	250.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	78.750	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: S56, DS/PN: S13.002

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.5
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	23.6
Safety Factor	2.0	Slope (1:X)	102.7
Porosity	0.30	Cap Volume Depth (m)	1.733
Invert Level (m)	76.895	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	24.6
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	102.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	78.628	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Porous Car Park Manhole: S62, DS/PN: S15.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.1
Max Percolation (l/s)	16.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.420	Membrane Depth (mm)	0

Porous Car Park Manhole: SP65, DS/PN: S16.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.6
Max Percolation (l/s)	10.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	80.210	Membrane Depth (mm)	0

Porous Car Park Manhole: SP81, DS/PN: S17.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	8.1
Max Percolation (l/s)	13.5	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	80.150	Membrane Depth (mm)	0

Porous Car Park Manhole: SP65, DS/PN: S18.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.6
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	21.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.940	Membrane Depth (mm)	0

Porous Car Park Manhole: SP87, DS/PN: S19.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	16.2
Max Percolation (l/s)	27.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	78.750	Membrane Depth (mm)	0

Porous Car Park Manhole: SP90, DS/PN: S20.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	11.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	78.250	Membrane Depth (mm)	0

Porous Car Park Manhole: SP93, DS/PN: S21.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.900	Membrane Depth (mm)	0

Porous Car Park Manhole: SP96, DS/PN: S22.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.8
Max Percolation (l/s)	8.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.765	Membrane Depth (mm)	0

Porous Car Park Manhole: SP99, DS/PN: S23.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.6
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	21.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.750	Membrane Depth (mm)	0

Porous Car Park Manhole: SP102, DS/PN: S24.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.7
Max Percolation (l/s)	29.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.300	Membrane Depth (mm)	0

Porous Car Park Manhole: SP105, DS/PN: S25.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.5
Membrane Percolation (mm/hr)	1000	Length (m)	9.4
Max Percolation (l/s)	11.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.285	Membrane Depth (mm)	0

Porous Car Park Manhole: SP108, DS/PN: S26.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.1
Membrane Percolation (mm/hr)	1000	Length (m)	8.8
Max Percolation (l/s)	17.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.150	Membrane Depth (mm)	0

Tank or Pond Manhole: S111, DS/PN: S27.001

Invert Level (m) 76.077

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	130.0	0.623	343.1	1.400	0.0	2.100	0.0
0.023	136.5	0.723	384.1	1.500	0.0	2.200	0.0
0.123	166.0	0.823	427.3	1.600	0.0	2.300	0.0
0.223	197.9	0.923	472.8	1.700	0.0	2.400	0.0
0.320	221.2	1.023	464.5	1.800	0.0	2.500	0.0
0.432	266.4	1.064	516.8	1.900	0.0		
0.523	303.8	1.300	0.0	2.000	0.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	32
Number of Online Controls	22	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.313
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 360, 720, 960, 1440, 2160
Return Period(s) (years)	1, 2, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	1	+0%					79.496
S2.000	SP16	15 Winter	1	+0%	1/15 Summer				79.601
S2.001	SP17	15 Winter	1	+0%	1/15 Summer				79.583
S2.002	S18	15 Winter	1	+0%	100/15 Summer				79.148
S1.001	S2	15 Winter	1	+0%					78.981
S1.002	S3	15 Winter	1	+0%					78.770
S3.000	SP19	15 Winter	1	+0%	1/15 Summer				79.190
S3.001	SP20	15 Winter	1	+0%	1/15 Summer				79.167
S3.002	S21	15 Winter	1	+0%	100/15 Summer				78.861
S1.003	S4	15 Winter	1	+0%					78.357
S1.004	S5	15 Winter	1	+0%	100/15 Summer				77.883
S4.000	SP22	15 Winter	1	+0%	1/15 Summer				78.799
S4.001	SP23	15 Winter	1	+0%	1/15 Summer				78.781
S4.002	S24	15 Winter	1	+0%					78.201

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.179	0.000	0.09			4.5	OK	
S2.000	SP16	0.061	0.000	0.29			2.4	SURCHARGED	
S2.001	SP17	0.208	0.000	0.21		10	2.4	SURCHARGED	
S2.002	S18	-0.057	0.000	0.37			2.4	OK	
S1.001	S2	-0.169	0.000	0.14			8.7	OK	
S1.002	S3	-0.170	0.000	0.14		11	10.1	OK	
S3.000	SP19	0.110	0.000	0.41			2.8	SURCHARGED	
S3.001	SP20	0.212	0.000	0.58		11	2.8	SURCHARGED	
S3.002	S21	-0.064	0.000	0.27			2.8	OK	
S1.003	S4	-0.163	0.000	0.17		7	12.8	OK	
S1.004	S5	-0.147	0.000	0.25		7	14.2	OK	
S4.000	SP22	0.074	0.000	0.30			2.2	SURCHARGED	
S4.001	SP23	0.206	0.000	0.15		10	2.2	SURCHARGED	
S4.002	S24	-0.069	0.000	0.20			2.2	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.005	S6	15 Winter	1	+0%	100/15 Summer				77.580
S5.000	SP25	15 Winter	1	+0%	1/15 Summer				78.374
S5.001	SP26	15 Winter	1	+0%	1/15 Summer				78.349
S5.002	S27	15 Winter	1	+0%					77.965
S1.006	S7	15 Winter	1	+0%	100/15 Summer				76.981
S1.007	S8	15 Winter	1	+0%	30/120 Winter				76.639
S6.000	SP28	15 Winter	1	+0%	100/15 Summer				77.886
S6.001	SP29	30 Winter	1	+0%	1/15 Summer				77.621
S6.002	S30	30 Winter	1	+0%					77.272
S7.000	SP31	15 Winter	1	+0%	1/15 Summer				79.266
S7.001	SP32	15 Winter	1	+0%	1/15 Summer				79.261
S7.002	S33	15 Winter	1	+0%	100/15 Summer				78.560
S7.003	S34	15 Winter	1	+0%					78.379
S8.000	SP39	15 Winter	1	+0%	1/15 Summer				78.965
S8.001	SP40	15 Winter	1	+0%	1/15 Summer				78.960
S8.002	S41	15 Winter	1	+0%	100/15 Summer				78.488
S7.004	S35	15 Winter	1	+0%					78.313
S9.000	SP42	30 Winter	1	+0%	1/15 Summer				78.890
S9.001	SP43	30 Winter	1	+0%	1/15 Summer				78.887
S9.002	S44	30 Winter	1	+0%					78.449
S10.000	SP45	15 Winter	1	+0%	1/15 Summer				79.222
S10.001	SP46	15 Winter	1	+0%	1/15 Summer				79.196
S10.002	S47	15 Winter	1	+0%	100/15 Summer				78.463
S7.005	S36	15 Winter	1	+0%	100/15 Summer				78.170
S11.000	SP43	15 Winter	1	+0%	1/15 Summer				79.029
S11.001	SP44	15 Winter	1	+0%	1/15 Summer				79.013
S11.002	S45	15 Winter	1	+0%	100/15 Summer				78.361
S12.000	SP46	15 Winter	1	+0%	1/15 Summer				79.261
S12.001	SP46	15 Winter	1	+0%	1/15 Summer				79.246
S12.002	S48	15 Winter	1	+0%	100/15 Summer				78.308
S7.006	S37	15 Winter	1	+0%	100/15 Summer				78.034
S7.007	S38	15 Winter	1	+0%	100/15 Summer				77.661
S1.008	S9	120 Winter	1	+0%	30/60 Winter				76.031
S13.000	S54	120 Winter	1	+0%	30/360 Winter				76.031
S13.001	S55	120 Winter	1	+0%					76.031
S14.000	SP58	15 Winter	1	+0%	100/15 Summer				77.328
S14.001	SP59	15 Winter	1	+0%	100/15 Summer				77.105
S14.002	S60	15 Winter	1	+0%	100/30 Winter				76.940
S13.002	S56	120 Winter	1	+0%	30/120 Winter				76.031
S15.000	SP61	15 Winter	1	+0%	1/15 Summer				77.052
S15.001	S62	15 Winter	1	+0%	1/15 Summer				77.042
S15.002	S63	15 Winter	1	+0%	30/15 Summer				76.564
S13.003	S57	120 Winter	1	+0%	30/60 Summer				76.031

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	S6	-0.150	0.000	0.24		8	17.4	OK	
S5.000	SP25	0.109	0.000	0.43			2.9	SURCHARGED	
S5.001	SP26	0.214	0.000	0.34		11	3.0	SURCHARGED	
S5.002	S27	-0.070	0.000	0.20			3.0	OK	
S1.006	S7	-0.145	0.000	0.27		8	21.5	OK*	
S1.007	S8	-0.136	0.000	0.33			21.6	OK	
S6.000	SP28	-0.064	0.000	0.28			2.5	FLOOD RISK	
S6.001	SP29	0.021	0.000	0.05		17	0.6	SURCHARGED	
S6.002	S30	-0.088	0.000	0.03			0.6	OK	
S7.000	SP31	0.166	0.000	0.29			1.5	SURCHARGED	
S7.001	SP32	0.195	0.000	0.08		8	1.5	SURCHARGED	
S7.002	S33	-0.066	0.000	0.24			1.5	OK	
S7.003	S34	-0.196	0.000	0.04			1.5	OK	
S8.000	SP39	0.115	0.000	0.18			1.5	SURCHARGED	
S8.001	SP40	0.195	0.000	0.12		8	1.5	SURCHARGED	
S8.002	S41	-0.067	0.000	0.23			1.5	OK	
S7.004	S35	-0.187	0.000	0.07			4.0	OK*	
S9.000	SP42	0.040	0.000	0.13		6	0.8	SURCHARGED	
S9.001	SP43	0.087	0.000	0.06			0.8	SURCHARGED	
S9.002	S44	-0.081	0.000	0.08			0.8	OK	
S10.000	SP45	0.172	0.000	0.60			2.7	SURCHARGED	
S10.001	SP46	0.211	0.000	0.14		11	2.7	SURCHARGED	
S10.002	S47	-0.067	0.000	0.24			2.7	OK	
S7.005	S36	-0.160	0.000	0.19			8.6	OK	
S11.000	SP43	0.179	0.000	0.50			2.3	SURCHARGED	
S11.001	SP44	0.208	0.000	0.14		11	2.4	SURCHARGED	
S11.002	S45	-0.069	0.000	0.20			2.3	OK	
S12.000	SP46	0.161	0.000	0.40			2.2	SURCHARGED	
S12.001	SP46	0.206	0.000	0.10		10	2.2	SURCHARGED	
S12.002	S48	-0.072	0.000	0.18			2.2	OK	
S7.006	S37	-0.146	0.000	0.26		9	14.4	OK	
S7.007	S38	-0.094	0.000	0.30			14.4	OK	
S1.008	S9	-0.464	0.000	0.02			16.4	OK	
S13.000	S54	-0.794	0.000	0.00		32	1.4	OK	
S13.001	S55	-0.684	0.000	0.00			1.4	OK*	
S14.000	SP58	-0.102	0.000	0.22			6.6	OK	
S14.001	SP59	-0.085	0.000	0.38			6.5	OK	
S14.002	S60	-0.105	0.000	0.19			6.6	OK	
S13.002	S56	-0.584	0.000	0.00		64	4.6	OK	
S15.000	SP61	0.102	0.000	0.29			2.8	SURCHARGED	
S15.001	S62	0.212	0.000	0.37		10	2.8	SURCHARGED	
S15.002	S63	-0.041	0.000	0.63			2.8	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S13.003	S57	-0.354	0.000	0.00			2.4	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.009	S10	120 Winter	1	+0%	30/30 Winter				76.031
S16.000	SP64	15 Winter	1	+0%	1/15 Summer				79.889
S16.001	SP65	15 Winter	1	+0%	1/15 Summer				79.875
S16.002	S66	15 Winter	1	+0%	30/15 Summer				79.334
S16.003	S67	15 Winter	1	+0%					79.135
S17.000	SP80	15 Winter	1	+0%	100/15 Summer				79.742
S17.001	SP81	15 Winter	1	+0%					79.682
S17.002	S82	15 Winter	1	+0%	100/15 Winter				79.228
S16.004	S68	15 Winter	1	+0%					78.990
S18.000	SP64	15 Winter	1	+0%	100/15 Summer				79.445
S18.001	SP65	15 Winter	1	+0%					79.382
S18.002	S85	15 Winter	1	+0%					79.212
S16.005	S69	15 Winter	1	+0%					78.868
S16.006	S70	15 Winter	1	+0%	100/60 Summer				76.261
S19.000	SP86	15 Winter	1	+0%	100/15 Summer				78.337
S19.001	SP87	15 Winter	1	+0%					78.170
S19.002	S88	15 Winter	1	+0%					77.751
S16.007	S71	15 Winter	1	+0%	100/30 Summer				76.129
S20.000	SP89	15 Winter	1	+0%	1/15 Summer				78.211
S20.001	SP90	15 Winter	1	+0%	1/15 Summer				78.201
S20.002	S91	15 Winter	1	+0%	100/60 Winter				77.073
S16.008	S72	15 Winter	1	+0%					76.050
S21.000	SP92	15 Winter	1	+0%	1/15 Summer				77.910
S21.001	SP93	15 Winter	1	+0%	1/15 Summer				77.904
S21.002	S94	15 Winter	1	+0%	30/360 Winter				76.833
S16.009	S73	120 Winter	1	+0%	30/120 Winter				76.031
S22.000	SP95	15 Winter	1	+0%	1/15 Summer				77.346
S22.001	SP96	15 Winter	1	+0%	1/15 Summer				77.343
S22.002	S97	15 Winter	1	+0%	100/30 Winter				76.961
S16.010	S74	120 Winter	1	+0%	30/120 Winter				76.031
S23.000	SP98	15 Winter	1	+0%	1/15 Summer				77.441
S23.001	SP99	15 Winter	1	+0%	1/15 Summer				77.425
S23.002	S100	15 Winter	1	+0%	100/30 Summer				76.923
S16.011	S75	120 Winter	1	+0%	30/120 Winter				76.031
S24.000	SP101	30 Winter	1	+0%	1/15 Summer				77.338
S24.001	SP102	60 Winter	1	+0%	1/15 Summer				77.335
S24.002	S103	60 Winter	1	+0%	30/120 Winter				76.546
S16.012	S77	120 Winter	1	+0%					76.031
S25.000	SP104	15 Winter	1	+0%	30/15 Summer				77.306
S25.001	SP105	15 Winter	1	+0%	1/15 Summer				77.303
S25.002	S106	15 Winter	1	+0%	30/60 Winter				76.446
S16.013	S78	120 Winter	1	+0%	30/60 Summer				76.031
S26.000	SP107	15 Winter	1	+0%	30/15 Summer				77.202

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.009	S10	-0.229	0.000	0.02			7.7	OK	
S16.000	SP64	0.164	0.000	0.44			3.1	SURCHARGED	
S16.001	SP65	0.215	0.000	0.21		11	3.1	SURCHARGED	
S16.002	S66	-0.046	0.000	0.55			3.1	OK	
S16.003	S67	-0.175	0.000	0.11			4.9	OK	
S17.000	SP80	-0.058	0.000	0.37			2.0	OK	
S17.001	SP81	-0.078	0.000	0.10		5	2.0	OK	
S17.002	S82	-0.067	0.000	0.23			2.0	OK	
S16.004	S68	-0.160	0.000	0.18			8.0	OK	
S18.000	SP64	-0.055	0.000	0.41			2.5	OK	
S18.001	SP65	-0.068	0.000	0.22		6	2.5	OK	
S18.002	S85	-0.068	0.000	0.22			2.5	OK	
S16.005	S69	-0.187	0.000	0.07			11.6	OK*	
S16.006	S70	-0.839	0.000	0.01			13.4	OK	
S19.000	SP86	-0.063	0.000	0.29			3.2	OK	
S19.001	SP87	-0.070	0.000	0.19		6	3.2	OK	
S19.002	S88	-0.074	0.000	0.15			3.2	OK	
S16.007	S71	-0.816	0.000	0.02			18.0	OK	
S20.000	SP89	0.111	0.000	0.24			1.9	SURCHARGED	
S20.001	SP90	0.201	0.000	0.07		8	1.9	SURCHARGED	
S20.002	S91	-0.077	0.000	0.12			1.8	OK	
S16.008	S72	-0.809	0.000	0.02			20.4	OK*	
S21.000	SP92	0.135	0.000	0.28			1.9	SURCHARGED	
S21.001	SP93	0.189	0.000	0.06		5	1.4	FLOOD RISK	
S21.002	S94	-0.072	0.000	0.18			1.4	OK	
S16.009	S73	-0.759	0.000	0.01			9.0	OK	
S22.000	SP95	0.096	0.000	0.18			1.0	SURCHARGED	
S22.001	SP96	0.133	0.000	0.09		6	0.9	SURCHARGED	
S22.002	S97	-0.084	0.000	0.06			1.0	OK	
S16.010	S74	-0.689	0.000	0.01			9.3	OK	
S23.000	SP98	0.191	0.000	0.59			3.5	SURCHARGED	
S23.001	SP99	0.220	0.000	0.27		11	3.5	SURCHARGED	
S23.002	S100	-0.067	0.000	0.23			3.5	OK	
S16.011	S75	-0.624	0.000	0.01			10.2	OK	
S24.000	SP101	0.013	0.000	0.49			2.9	FLOOD RISK	
S24.001	SP102	0.055	0.000	0.03		26	0.7	FLOOD RISK	
S24.002	S103	-0.084	0.000	0.06			0.7	OK	
S16.012	S77	-0.424	0.000	0.01			7.0	OK*	
S25.000	SP104	-0.019	0.000	0.27			1.5	OK	
S25.001	SP105	0.018	0.000	0.03		7	0.6	FLOOD RISK	
S25.002	S106	-0.084	0.000	0.06			0.6	OK	
S16.013	S78	-0.354	0.000	0.01			5.5	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S26.000	SP107	-0.048	0.000	0.53			2.5	FLOOD RISK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S26.001	SP108	60 Winter	1	+0%	2/15 Winter			
S26.002	S109	60 Winter	1	+0%	30/60 Winter			
S16.014	S79	120 Winter	1	+0%				
S27.000	S110	15 Summer	1	+0%	100/30 Summer			
S27.001	S111	15 Summer	1	+0%	100/60 Winter			
S1.010	S10	120 Winter	1	+0%	1/15 Summer		100/30 Summer	16
S1.011	S12	120 Winter	1	+0%				
S1.012	S13	120 Winter	1	+0%				
S1.013	S14	120 Winter	1	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S26.001	SP108	77.193	-0.007	0.000	0.02		26	0.5	FLOOD RISK	
S26.002	S109	76.331	-0.084	0.000	0.06			0.5	OK	
S16.014	S79	76.031	-0.279	0.000	0.00			4.1	OK*	
S27.000	S110	75.927	-0.150	0.000	0.00			0.0	OK	
S27.001	S111	75.877	-0.600	0.000	0.00			0.0	OK*	
S1.010	S10	76.030	0.695	0.000	0.52	0.0		7.0	SURCHARGED	
S1.011	S12	75.185	-0.075	0.000	0.50			7.0	OK	
S1.012	S13	74.982	-0.088	0.000	0.36			7.0	OK	
S1.013	S14	71.970	-0.090	0.000	0.34			7.0	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	32
Number of Online Controls	22	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.313
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 360, 720, 960, 1440, 2160
Return Period(s) (years)	1, 2, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	2	+0%					79.502
S2.000	SP16	15 Winter	2	+0%	1/15 Summer				79.616
S2.001	SP17	15 Winter	2	+0%	1/15 Summer				79.590
S2.002	S18	15 Winter	2	+0%	100/15 Summer				79.154
S1.001	S2	15 Winter	2	+0%					78.990
S1.002	S3	15 Winter	2	+0%					78.779
S3.000	SP19	15 Winter	2	+0%	1/15 Summer				79.214
S3.001	SP20	15 Winter	2	+0%	1/15 Summer				79.177
S3.002	S21	15 Winter	2	+0%	100/15 Summer				78.866
S1.003	S4	15 Winter	2	+0%					78.366
S1.004	S5	15 Winter	2	+0%	100/15 Summer				77.895
S4.000	SP22	15 Winter	2	+0%	1/15 Summer				78.813
S4.001	SP23	15 Winter	2	+0%	1/15 Summer				78.788
S4.002	S24	15 Winter	2	+0%					78.205

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.173	0.000	0.12			5.8	OK	
S2.000	SP16	0.076	0.000	0.39			3.1	SURCHARGED	
S2.001	SP17	0.215	0.000	0.27		10	3.1	SURCHARGED	
S2.002	S18	-0.051	0.000	0.48			3.1	OK	
S1.001	S2	-0.160	0.000	0.18			11.3	OK	
S1.002	S3	-0.161	0.000	0.18		12	13.3	OK	
S3.000	SP19	0.134	0.000	0.53			3.6	SURCHARGED	
S3.001	SP20	0.222	0.000	0.75		11	3.6	SURCHARGED	
S3.002	S21	-0.059	0.000	0.35			3.6	OK	
S1.003	S4	-0.154	0.000	0.22		7	16.8	OK	
S1.004	S5	-0.135	0.000	0.33		7	18.7	OK	
S4.000	SP22	0.088	0.000	0.40			2.9	SURCHARGED	
S4.001	SP23	0.213	0.000	0.19		10	2.9	SURCHARGED	
S4.002	S24	-0.065	0.000	0.26			2.9	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.005	S6	15 Winter	2	+0%	100/15 Summer				77.591
S5.000	SP25	15 Winter	2	+0%	1/15 Summer				78.402
S5.001	SP26	15 Winter	2	+0%	1/15 Summer				78.360
S5.002	S27	15 Winter	2	+0%					77.969
S1.006	S7	15 Winter	2	+0%	100/15 Summer				76.994
S1.007	S8	15 Winter	2	+0%	30/120 Winter				76.653
S6.000	SP28	15 Winter	2	+0%	100/15 Summer				77.892
S6.001	SP29	30 Winter	2	+0%	1/15 Summer				77.641
S6.002	S30	30 Winter	2	+0%					77.272
S7.000	SP31	15 Winter	2	+0%	1/15 Summer				79.278
S7.001	SP32	15 Winter	2	+0%	1/15 Summer				79.271
S7.002	S33	15 Winter	2	+0%	100/15 Summer				78.567
S7.003	S34	15 Winter	2	+0%					78.385
S8.000	SP39	15 Winter	2	+0%	1/15 Summer				78.977
S8.001	SP40	15 Winter	2	+0%	1/15 Summer				78.970
S8.002	S41	15 Winter	2	+0%	100/15 Summer				78.496
S7.004	S35	15 Winter	2	+0%					78.322
S9.000	SP42	15 Winter	2	+0%	1/15 Summer				78.981
S9.001	SP43	15 Winter	2	+0%	1/15 Summer				78.977
S9.002	S44	30 Summer	2	+0%					78.451
S10.000	SP45	15 Winter	2	+0%	1/15 Summer				79.246
S10.001	SP46	15 Winter	2	+0%	1/15 Summer				79.204
S10.002	S47	15 Winter	2	+0%	100/15 Summer				78.468
S7.005	S36	15 Winter	2	+0%	100/15 Summer				78.183
S11.000	SP43	15 Winter	2	+0%	1/15 Summer				79.041
S11.001	SP44	15 Winter	2	+0%	1/15 Summer				79.020
S11.002	S45	15 Winter	2	+0%	100/15 Summer				78.365
S12.000	SP46	15 Winter	2	+0%	1/15 Summer				79.272
S12.001	SP46	15 Winter	2	+0%	1/15 Summer				79.253
S12.002	S48	15 Winter	2	+0%	100/15 Summer				78.313
S7.006	S37	15 Winter	2	+0%	100/15 Summer				78.050
S7.007	S38	15 Winter	2	+0%	100/15 Summer				77.673
S1.008	S9	120 Winter	2	+0%	30/60 Winter				76.140
S13.000	S54	120 Winter	2	+0%	30/360 Winter				76.140
S13.001	S55	120 Winter	2	+0%					76.140
S14.000	SP58	15 Winter	2	+0%	100/15 Summer				77.334
S14.001	SP59	15 Winter	2	+0%	100/15 Summer				77.115
S14.002	S60	15 Winter	2	+0%	100/30 Winter				76.946
S13.002	S56	120 Winter	2	+0%	30/120 Winter				76.140
S15.000	SP61	15 Winter	2	+0%	1/15 Summer				77.068
S15.001	S62	15 Winter	2	+0%	1/15 Summer				77.052
S15.002	S63	15 Winter	2	+0%	30/15 Summer				76.575
S13.003	S57	120 Winter	2	+0%	30/60 Summer				76.140

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	S6	-0.139	0.000	0.31		7	22.6	OK	
S5.000	SP25	0.137	0.000	0.55			3.8	SURCHARGED	
S5.001	SP26	0.225	0.000	0.43		11	3.8	SURCHARGED	
S5.002	S27	-0.066	0.000	0.25			3.8	OK	
S1.006	S7	-0.132	0.000	0.35		7	27.9	OK*	
S1.007	S8	-0.122	0.000	0.43			28.1	OK	
S6.000	SP28	-0.058	0.000	0.36			3.3	FLOOD RISK	
S6.001	SP29	0.041	0.000	0.05		21	0.7	SURCHARGED	
S6.002	S30	-0.088	0.000	0.04			0.7	OK	
S7.000	SP31	0.178	0.000	0.41			2.1	SURCHARGED	
S7.001	SP32	0.205	0.000	0.12		9	2.2	SURCHARGED	
S7.002	S33	-0.059	0.000	0.35			2.2	OK	
S7.003	S34	-0.190	0.000	0.06			2.2	OK	
S8.000	SP39	0.127	0.000	0.26			2.1	SURCHARGED	
S8.001	SP40	0.205	0.000	0.18		9	2.2	SURCHARGED	
S8.002	S41	-0.059	0.000	0.34			2.2	OK	
S7.004	S35	-0.178	0.000	0.10			5.7	OK*	
S9.000	SP42	0.131	0.000	0.18		5	1.1	SURCHARGED	
S9.001	SP43	0.177	0.000	0.07			1.1	SURCHARGED	
S9.002	S44	-0.079	0.000	0.10			1.1	OK	
S10.000	SP45	0.196	0.000	0.78			3.5	SURCHARGED	
S10.001	SP46	0.219	0.000	0.18		12	3.5	SURCHARGED	
S10.002	S47	-0.062	0.000	0.30			3.5	OK	
S7.005	S36	-0.147	0.000	0.26			11.9	OK	
S11.000	SP43	0.191	0.000	0.66			3.1	SURCHARGED	
S11.001	SP44	0.215	0.000	0.18		11	3.1	SURCHARGED	
S11.002	S45	-0.065	0.000	0.26			3.1	OK	
S12.000	SP46	0.172	0.000	0.53			2.9	SURCHARGED	
S12.001	SP46	0.213	0.000	0.13		11	2.9	SURCHARGED	
S12.002	S48	-0.067	0.000	0.23			2.9	OK	
S7.006	S37	-0.130	0.000	0.36		8	19.9	OK	
S7.007	S38	-0.082	0.000	0.42			20.0	OK	
S1.008	S9	-0.355	0.000	0.02			20.5	OK	
S13.000	S54	-0.685	0.000	0.00		60	1.7	OK	
S13.001	S55	-0.575	0.000	0.00			1.5	OK*	
S14.000	SP58	-0.096	0.000	0.28			8.6	OK	
S14.001	SP59	-0.075	0.000	0.49			8.5	OK	
S14.002	S60	-0.099	0.000	0.25			8.5	OK	
S13.002	S56	-0.475	0.000	0.00		88	5.3	OK	
S15.000	SP61	0.118	0.000	0.38			3.6	SURCHARGED	
S15.001	S62	0.222	0.000	0.48		11	3.6	SURCHARGED	
S15.002	S63	-0.030	0.000	0.82			3.6	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S13.003	S57	-0.245	0.000	0.00			2.4	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.009	S10	120 Winter	2	+0%	30/30 Winter				76.140
S16.000	SP64	15 Winter	2	+0%	1/15 Summer				79.911
S16.001	SP65	15 Winter	2	+0%	1/15 Summer				79.889
S16.002	S66	15 Winter	2	+0%	30/15 Summer				79.343
S16.003	S67	15 Winter	2	+0%					79.142
S17.000	SP80	15 Winter	2	+0%	100/15 Summer				79.749
S17.001	SP81	15 Winter	2	+0%					79.685
S17.002	S82	15 Winter	2	+0%	100/15 Winter				79.233
S16.004	S68	15 Winter	2	+0%					78.999
S18.000	SP64	15 Winter	2	+0%	100/15 Summer				79.452
S18.001	SP65	15 Winter	2	+0%					79.387
S18.002	S85	15 Winter	2	+0%					79.217
S16.005	S69	15 Winter	2	+0%					78.875
S16.006	S70	15 Winter	2	+0%	100/60 Summer				76.279
S19.000	SP86	15 Winter	2	+0%	100/15 Summer				78.343
S19.001	SP87	15 Winter	2	+0%					78.174
S19.002	S88	15 Winter	2	+0%					77.755
S16.007	S71	15 Winter	2	+0%	100/30 Summer				76.141
S20.000	SP89	15 Winter	2	+0%	1/15 Summer				78.221
S20.001	SP90	15 Winter	2	+0%	1/15 Summer				78.209
S20.002	S91	15 Winter	2	+0%	100/60 Winter				77.078
S16.008	S72	120 Winter	2	+0%					76.139
S21.000	SP92	15 Winter	2	+0%	1/15 Summer				77.919
S21.001	SP93	15 Winter	2	+0%	1/15 Summer				77.912
S21.002	S94	15 Winter	2	+0%	30/360 Winter				76.836
S16.009	S73	120 Winter	2	+0%	30/120 Winter				76.139
S22.000	SP95	15 Winter	2	+0%	1/15 Summer				77.410
S22.001	SP96	15 Winter	2	+0%	1/15 Summer				77.404
S22.002	S97	15 Winter	2	+0%	100/30 Winter				76.966
S16.010	S74	120 Winter	2	+0%	30/120 Winter				76.139
S23.000	SP98	15 Winter	2	+0%	1/15 Summer				77.471
S23.001	SP99	15 Winter	2	+0%	1/15 Summer				77.444
S23.002	S100	15 Winter	2	+0%	100/30 Summer				76.928
S16.011	S75	120 Winter	2	+0%	30/120 Winter				76.139
S24.000	SP101	60 Winter	2	+0%	1/15 Summer				77.355
S24.001	SP102	60 Winter	2	+0%	1/15 Summer				77.353
S24.002	S103	60 Winter	2	+0%	30/120 Winter				76.547
S16.012	S77	120 Winter	2	+0%					76.139
S25.000	SP104	30 Winter	2	+0%	30/15 Summer				77.318
S25.001	SP105	30 Winter	2	+0%	1/15 Summer				77.316
S25.002	S106	30 Winter	2	+0%	30/60 Winter				76.446
S16.013	S78	120 Winter	2	+0%	30/60 Summer				76.139
S26.000	SP107	30 Winter	2	+0%	30/15 Summer				77.217

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.009	S10	-0.120	0.000	0.02			9.3	OK	
S16.000	SP64	0.186	0.000	0.57			4.0	SURCHARGED	
S16.001	SP65	0.229	0.000	0.27		11	4.0	SURCHARGED	
S16.002	S66	-0.037	0.000	0.71			4.0	OK	
S16.003	S67	-0.168	0.000	0.14			6.3	OK	
S17.000	SP80	-0.051	0.000	0.48			2.6	OK	
S17.001	SP81	-0.075	0.000	0.14		5	2.5	OK	
S17.002	S82	-0.062	0.000	0.30			2.5	OK	
S16.004	S68	-0.151	0.000	0.24			10.2	OK	
S18.000	SP64	-0.048	0.000	0.53			3.3	OK	
S18.001	SP65	-0.063	0.000	0.28		6	3.2	OK	
S18.002	S85	-0.063	0.000	0.28			3.3	OK	
S16.005	S69	-0.180	0.000	0.09			15.0	OK*	
S16.006	S70	-0.821	0.000	0.02			17.7	OK	
S19.000	SP86	-0.057	0.000	0.38			4.2	OK	
S19.001	SP87	-0.066	0.000	0.25		6	4.2	OK	
S19.002	S88	-0.070	0.000	0.20			4.1	OK	
S16.007	S71	-0.804	0.000	0.03			23.5	OK	
S20.000	SP89	0.121	0.000	0.32			2.5	SURCHARGED	
S20.001	SP90	0.209	0.000	0.10		10	2.5	SURCHARGED	
S20.002	S91	-0.072	0.000	0.17			2.5	OK	
S16.008	S72	-0.721	0.000	0.01			10.5	OK*	
S21.000	SP92	0.144	0.000	0.38			2.6	SURCHARGED	
S21.001	SP93	0.197	0.000	0.07		5	1.6	FLOOD RISK	
S21.002	S94	-0.069	0.000	0.21			1.6	OK	
S16.009	S73	-0.651	0.000	0.01			11.2	OK	
S22.000	SP95	0.160	0.000	0.26			1.4	SURCHARGED	
S22.001	SP96	0.194	0.000	0.14		8	1.4	SURCHARGED	
S22.002	S97	-0.079	0.000	0.09			1.5	OK	
S16.010	S74	-0.580	0.000	0.01			11.3	OK	
S23.000	SP98	0.221	0.000	0.76			4.5	SURCHARGED	
S23.001	SP99	0.239	0.000	0.35		12	4.5	SURCHARGED	
S23.002	S100	-0.062	0.000	0.30			4.5	OK	
S16.011	S75	-0.515	0.000	0.01			11.8	OK	
S24.000	SP101	0.030	0.000	0.44			2.6	FLOOD RISK	
S24.001	SP102	0.073	0.000	0.03		32	0.8	FLOOD RISK	
S24.002	S103	-0.083	0.000	0.07			0.8	OK	
S16.012	S77	-0.315	0.000	0.01			7.3	OK*	
S25.000	SP104	-0.007	0.000	0.28			1.6	OK	
S25.001	SP105	0.031	0.000	0.03		12	0.7	FLOOD RISK	
S25.002	S106	-0.084	0.000	0.06			0.7	OK	
S16.013	S78	-0.245	0.000	0.01			5.4	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S26.000	SP107	-0.033	0.000	0.55			2.6	FLOOD RISK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S26.001	SP108	60 Winter	2	+0%	2/15 Winter			
S26.002	S109	60 Winter	2	+0%	30/60 Winter			
S16.014	S79	120 Winter	2	+0%				
S27.000	S110	15 Summer	2	+0%	100/30 Summer			
S27.001	S111	15 Summer	2	+0%	100/60 Winter			
S1.010	S10	120 Winter	2	+0%	1/15 Summer		100/30 Summer	16
S1.011	S12	120 Winter	2	+0%				
S1.012	S13	120 Winter	2	+0%				
S1.013	S14	120 Winter	2	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S26.001	SP108	77.212	0.012	0.000	0.02		31	0.6	FLOOD RISK	
S26.002	S109	76.332	-0.083	0.000	0.07			0.6	OK	
S16.014	S79	76.139	-0.171	0.000	0.00			4.0	OK*	
S27.000	S110	75.927	-0.150	0.000	0.00			0.0	OK	
S27.001	S111	75.877	-0.600	0.000	0.00			0.0	OK*	
S1.010	S10	76.139	0.804	0.000	0.55	0.0		7.4	SURCHARGED	
S1.011	S12	75.188	-0.072	0.000	0.53			7.4	OK	
S1.012	S13	74.984	-0.086	0.000	0.39			7.4	OK	
S1.013	S14	71.972	-0.088	0.000	0.36			7.4	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	32
Number of Online Controls	22	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.313
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 360, 720, 960, 1440, 2160
Return Period(s) (years)	1, 2, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	30	+0%					79.522
S2.000	SP16	15 Winter	30	+0%	1/15 Summer				79.728
S2.001	SP17	15 Winter	30	+0%	1/15 Summer				79.637
S2.002	S18	15 Winter	30	+0%	100/15 Summer				79.179
S1.001	S2	15 Winter	30	+0%					79.019
S1.002	S3	15 Winter	30	+0%					78.808
S3.000	SP19	15 Winter	30	+0%	1/15 Summer				79.366
S3.001	SP20	15 Winter	30	+0%	1/15 Summer				79.236
S3.002	S21	15 Winter	30	+0%	100/15 Summer				78.884
S1.003	S4	15 Winter	30	+0%					78.398
S1.004	S5	15 Winter	30	+0%	100/15 Summer				77.941
S4.000	SP22	15 Winter	30	+0%	1/15 Summer				78.918
S4.001	SP23	15 Winter	30	+0%	1/15 Summer				78.831
S4.002	S24	15 Winter	30	+0%					78.220

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.153	0.000	0.22			11.0	OK	
S2.000	SP16	0.188	0.000	0.72			5.8	SURCHARGED	
S2.001	SP17	0.262	0.000	0.51		11	5.8	SURCHARGED	
S2.002	S18	-0.026	0.000	0.90			5.8	OK	
S1.001	S2	-0.131	0.000	0.35			21.8	OK	
S1.002	S3	-0.132	0.000	0.35		8	26.3	OK	
S3.000	SP19	0.286	0.000	0.99			6.8	SURCHARGED	
S3.001	SP20	0.281	0.000	1.42		12	6.8	SURCHARGED	
S3.002	S21	-0.041	0.000	0.66			6.8	OK	
S1.003	S4	-0.122	0.000	0.43		6	33.2	OK	
S1.004	S5	-0.089	0.000	0.67		5	37.5	OK	
S4.000	SP22	0.193	0.000	0.74			5.4	SURCHARGED	
S4.001	SP23	0.256	0.000	0.36		11	5.5	SURCHARGED	
S4.002	S24	-0.050	0.000	0.50			5.5	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.005	S6	15 Winter	30	+0%	100/15 Summer				77.633
S5.000	SP25	15 Winter	30	+0%	1/15 Summer				78.566
S5.001	SP26	15 Winter	30	+0%	1/15 Summer				78.421
S5.002	S27	15 Winter	30	+0%					77.983
S1.006	S7	15 Winter	30	+0%	100/15 Summer				77.041
S1.007	S8	360 Winter	30	+0%	30/120 Winter				76.931
S6.000	SP28	15 Winter	30	+0%	100/15 Summer				77.911
S6.001	SP29	60 Winter	30	+0%	1/15 Summer				77.735
S6.002	S30	60 Winter	30	+0%					77.275
S7.000	SP31	15 Winter	30	+0%	1/15 Summer				79.321
S7.001	SP32	15 Winter	30	+0%	1/15 Summer				79.298
S7.002	S33	15 Winter	30	+0%	100/15 Summer				78.586
S7.003	S34	15 Winter	30	+0%					78.399
S8.000	SP39	15 Winter	30	+0%	1/15 Summer				79.019
S8.001	SP40	15 Winter	30	+0%	1/15 Summer				78.996
S8.002	S41	15 Winter	30	+0%	100/15 Summer				78.514
S7.004	S35	15 Winter	30	+0%					78.343
S9.000	SP42	15 Winter	30	+0%	1/15 Summer				79.026
S9.001	SP43	15 Winter	30	+0%	1/15 Summer				79.015
S9.002	S44	15 Winter	30	+0%					78.468
S10.000	SP45	15 Winter	30	+0%	1/15 Summer				79.406
S10.001	SP46	15 Winter	30	+0%	1/15 Summer				79.260
S10.002	S47	15 Winter	30	+0%	100/15 Summer				78.484
S7.005	S36	15 Winter	30	+0%	100/15 Summer				78.227
S11.000	SP43	15 Winter	30	+0%	1/15 Summer				79.140
S11.001	SP44	15 Winter	30	+0%	1/15 Summer				79.068
S11.002	S45	15 Winter	30	+0%	100/15 Summer				78.380
S12.000	SP46	15 Winter	30	+0%	1/15 Summer				79.360
S12.001	SP46	15 Winter	30	+0%	1/15 Summer				79.297
S12.002	S48	15 Winter	30	+0%	100/15 Summer				78.327
S7.006	S37	15 Winter	30	+0%	100/15 Summer				78.104
S7.007	S38	15 Winter	30	+0%	100/15 Summer				77.714
S1.008	S9	360 Winter	30	+0%	30/60 Winter				76.928
S13.000	S54	360 Winter	30	+0%	30/360 Winter				76.927
S13.001	S55	120 Winter	30	+0%					76.715
S14.000	SP58	15 Winter	30	+0%	100/15 Summer				77.359
S14.001	SP59	15 Winter	30	+0%	100/15 Summer				77.155
S14.002	S60	15 Winter	30	+0%	100/30 Winter				76.968
S13.002	S56	360 Winter	30	+0%	30/120 Winter				76.927
S15.000	SP61	15 Winter	30	+0%	1/15 Summer				77.175
S15.001	S62	15 Winter	30	+0%	1/15 Summer				77.112
S15.002	S63	360 Winter	30	+0%	30/15 Summer				76.929
S13.003	S57	360 Winter	30	+0%	30/60 Summer				76.927

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	S6	-0.097	0.000	0.62		5	45.4	OK	
S5.000	SP25	0.301	0.000	1.04			7.1	SURCHARGED	
S5.001	SP26	0.286	0.000	0.81		12	7.1	SURCHARGED	
S5.002	S27	-0.052	0.000	0.47			7.1	OK	
S1.006	S7	-0.085	0.000	0.70		5	55.7	OK*	
S1.007	S8	0.156	0.000	0.14			9.5	SURCHARGED	
S6.000	SP28	-0.039	0.000	0.68			6.2	FLOOD RISK	
S6.001	SP29	0.135	0.000	0.07		39	1.0	SURCHARGED	
S6.002	S30	-0.085	0.000	0.05			1.0	OK	
S7.000	SP31	0.221	0.000	0.80			4.1	SURCHARGED	
S7.001	SP32	0.232	0.000	0.22		10	4.1	SURCHARGED	
S7.002	S33	-0.040	0.000	0.66			4.1	OK	
S7.003	S34	-0.176	0.000	0.11			4.2	OK	
S8.000	SP39	0.169	0.000	0.51			4.1	SURCHARGED	
S8.001	SP40	0.231	0.000	0.34		10	4.1	SURCHARGED	
S8.002	S41	-0.041	0.000	0.64			4.1	OK	
S7.004	S35	-0.157	0.000	0.19			11.2	OK*	
S9.000	SP42	0.176	0.000	0.50		9	3.1	SURCHARGED	
S9.001	SP43	0.215	0.000	0.21			3.1	SURCHARGED	
S9.002	S44	-0.062	0.000	0.30			3.1	OK	
S10.000	SP45	0.356	0.000	1.47			6.5	SURCHARGED	
S10.001	SP46	0.275	0.000	0.35		13	6.5	SURCHARGED	
S10.002	S47	-0.046	0.000	0.57			6.5	OK	
S7.005	S36	-0.103	0.000	0.56			25.5	OK	
S11.000	SP43	0.290	0.000	1.23			5.8	SURCHARGED	
S11.001	SP44	0.263	0.000	0.34		12	5.8	SURCHARGED	
S11.002	S45	-0.050	0.000	0.50			5.8	OK	
S12.000	SP46	0.260	0.000	1.00			5.4	SURCHARGED	
S12.001	SP46	0.257	0.000	0.24		12	5.5	SURCHARGED	
S12.002	S48	-0.053	0.000	0.44			5.5	OK	
S7.006	S37	-0.076	0.000	0.76		5	41.6	OK	
S7.007	S38	-0.041	0.000	0.87			41.3	OK	
S1.008	S9	0.433	0.000	0.02			18.6	SURCHARGED	
S13.000	S54	0.102	0.000	0.00		161	1.3	SURCHARGED	
S13.001	S55	0.000	0.000	0.00			2.2	SURCHARGED*	
S14.000	SP58	-0.071	0.000	0.53			16.3	OK	
S14.001	SP59	-0.035	0.000	0.92			16.0	OK	
S14.002	S60	-0.077	0.000	0.46			16.2	OK	
S13.002	S56	0.312	0.000	0.00		213	3.2	SURCHARGED	
S15.000	SP61	0.225	0.000	0.70			6.8	SURCHARGED	
S15.001	S62	0.282	0.000	0.90		11	6.8	SURCHARGED	
S15.002	S63	0.324	0.000	0.26			1.2	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S13.003	S57	0.542	0.000	0.00			3.9	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.009	S10	360 Winter	30	+0%	30/30 Winter				76.928
S16.000	SP64	15 Winter	30	+0%	1/15 Summer				80.035
S16.001	SP65	15 Winter	30	+0%	1/15 Summer				79.955
S16.002	S66	15 Winter	30	+0%	30/15 Summer				79.432
S16.003	S67	15 Winter	30	+0%					79.168
S17.000	SP80	15 Winter	30	+0%	100/15 Summer				79.775
S17.001	SP81	15 Winter	30	+0%					79.695
S17.002	S82	15 Winter	30	+0%	100/15 Winter				79.250
S16.004	S68	15 Winter	30	+0%					79.035
S18.000	SP64	15 Winter	30	+0%	100/15 Summer				79.488
S18.001	SP65	15 Winter	30	+0%					79.402
S18.002	S85	15 Winter	30	+0%					79.232
S16.005	S69	15 Winter	30	+0%					78.894
S16.006	S70	360 Winter	30	+0%	100/60 Summer				76.928
S19.000	SP86	15 Winter	30	+0%	100/15 Summer				78.363
S19.001	SP87	15 Winter	30	+0%					78.189
S19.002	S88	15 Winter	30	+0%					77.768
S16.007	S71	360 Winter	30	+0%	100/30 Summer				76.928
S20.000	SP89	15 Winter	30	+0%	1/15 Summer				78.282
S20.001	SP90	15 Winter	30	+0%	1/15 Summer				78.244
S20.002	S91	15 Winter	30	+0%	100/60 Winter				77.089
S16.008	S72	360 Winter	30	+0%					76.860
S21.000	SP92	15 Winter	30	+0%	1/15 Summer				77.961
S21.001	SP93	15 Winter	30	+0%	1/15 Summer				77.936
S21.002	S94	360 Winter	30	+0%	30/360 Winter				76.928
S16.009	S73	360 Winter	30	+0%	30/120 Winter				76.927
S22.000	SP95	15 Winter	30	+0%	1/15 Summer				77.439
S22.001	SP96	15 Winter	30	+0%	1/15 Summer				77.425
S22.002	S97	15 Winter	30	+0%	100/30 Winter				76.975
S16.010	S74	360 Winter	30	+0%	30/120 Winter				76.927
S23.000	SP98	15 Winter	30	+0%	1/15 Summer				77.620
S23.001	SP99	15 Winter	30	+0%	1/15 Summer				77.525
S23.002	S100	15 Winter	30	+0%	100/30 Summer				76.943
S16.011	S75	360 Winter	30	+0%	30/120 Winter				76.927
S24.000	SP101	15 Winter	30	+0%	1/15 Summer				77.453
S24.001	SP102	60 Winter	30	+0%	1/15 Summer				77.435
S24.002	S103	360 Winter	30	+0%	30/120 Winter				76.929
S16.012	S77	120 Summer	30	+0%					76.455
S25.000	SP104	30 Winter	30	+0%	30/15 Summer				77.381
S25.001	SP105	30 Winter	30	+0%	1/15 Summer				77.378
S25.002	S106	360 Winter	30	+0%	30/60 Winter				76.928
S16.013	S78	360 Winter	30	+0%	30/60 Summer				76.927
S26.000	SP107	60 Winter	30	+0%	30/15 Summer				77.309

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.009	S10	0.668	0.000	0.04			18.4	SURCHARGED	
S16.000	SP64	0.310	0.000	1.08			7.5	SURCHARGED	
S16.001	SP65	0.295	0.000	0.51		12	7.5	SURCHARGED	
S16.002	S66	0.052	0.000	1.34			7.5	SURCHARGED	
S16.003	S67	-0.142	0.000	0.28			12.4	OK	
S17.000	SP80	-0.025	0.000	0.91			4.8	OK	
S17.001	SP81	-0.065	0.000	0.26		6	4.8	OK	
S17.002	S82	-0.045	0.000	0.57			4.8	OK	
S16.004	S68	-0.115	0.000	0.47			20.5	OK	
S18.000	SP64	-0.012	0.000	0.99			6.1	OK	
S18.001	SP65	-0.048	0.000	0.54		6	6.2	OK	
S18.002	S85	-0.048	0.000	0.54			6.2	OK	
S16.005	S69	-0.161	0.000	0.17			30.0	OK*	
S16.006	S70	-0.172	0.000	0.01			6.0	OK	
S19.000	SP86	-0.037	0.000	0.71			8.0	OK	
S19.001	SP87	-0.051	0.000	0.47		6	7.9	OK	
S19.002	S88	-0.057	0.000	0.37			7.8	OK	
S16.007	S71	-0.017	0.000	0.01			7.2	OK	
S20.000	SP89	0.182	0.000	0.60			4.8	SURCHARGED	
S20.001	SP90	0.244	0.000	0.19		11	4.8	SURCHARGED	
S20.002	S91	-0.061	0.000	0.32			4.8	OK	
S16.008	S72	0.000	0.000	0.01			7.5	SURCHARGED*	
S21.000	SP92	0.186	0.000	0.70			4.7	SURCHARGED	
S21.001	SP93	0.221	0.000	0.14		6	3.6	FLOOD RISK	
S21.002	S94	0.023	0.000	0.10			0.8	SURCHARGED	
S16.009	S73	0.137	0.000	0.01			7.2	SURCHARGED	
S22.000	SP95	0.189	0.000	0.58			3.1	SURCHARGED	
S22.001	SP96	0.215	0.000	0.30		10	3.1	SURCHARGED	
S22.002	S97	-0.070	0.000	0.19			3.1	OK	
S16.010	S74	0.207	0.000	0.01			6.8	SURCHARGED	
S23.000	SP98	0.370	0.000	1.43			8.4	FLOOD RISK	
S23.001	SP99	0.320	0.000	0.65		12	8.4	SURCHARGED	
S23.002	S100	-0.047	0.000	0.56			8.4	OK	
S16.011	S75	0.272	0.000	0.01			6.8	SURCHARGED	
S24.000	SP101	0.128	0.000	1.45			8.6	FLOOD RISK	
S24.001	SP102	0.155	0.000	0.04		52	1.0	FLOOD RISK	
S24.002	S103	0.299	0.000	0.08			0.9	SURCHARGED	
S16.012	S77	0.000	0.000	0.01			8.5	SURCHARGED*	
S25.000	SP104	0.056	0.000	0.53			3.0	FLOOD RISK	
S25.001	SP105	0.093	0.000	0.03		21	0.8	FLOOD RISK	
S25.002	S106	0.398	0.000	0.06			0.6	SURCHARGED	
S16.013	S78	0.542	0.000	0.01			6.3	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S26.000	SP107	0.059	0.000	0.70			3.3	FLOOD RISK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S26.001	SP108	60 Winter	30	+0%	2/15 Winter			
S26.002	S109	360 Winter	30	+0%	30/60 Winter			
S16.014	S79	60 Summer	30	+0%				
S27.000	S110	15 Summer	30	+0%	100/30 Summer			
S27.001	S111	15 Summer	30	+0%	100/60 Winter			
S1.010	S10	360 Winter	30	+0%	1/15 Summer		100/30 Summer	16
S1.011	S12	360 Winter	30	+0%				
S1.012	S13	360 Winter	30	+0%				
S1.013	S14	360 Winter	30	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S26.001	SP108	77.302	0.102	0.000	0.04		46	0.9	FLOOD RISK
S26.002	S109	76.929	0.514	0.000	0.07			0.7	SURCHARGED
S16.014	S79	76.310	0.000	0.000	0.01			5.6	SURCHARGED*
S27.000	S110	75.927	-0.150	0.000	0.00			0.0	OK
S27.001	S111	75.877	-0.600	0.000	0.00			0.0	OK*
S1.010	S10	76.927	1.592	0.000	0.75	0.0		10.0	SURCHARGED
S1.011	S12	75.204	-0.056	0.000	0.72			10.0	OK
S1.012	S13	74.997	-0.073	0.000	0.52			10.0	OK
S1.013	S14	71.984	-0.076	0.000	0.48			10.0	OK

PN	US/MH Name	Level Exceeded
S26.001	SP108	
S26.002	S109	
S16.014	S79	
S27.000	S110	
S27.001	S111	
S1.010	S10	
S1.011	S12	
S1.012	S13	
S1.013	S14	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	32
Number of Online Controls	22	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.313
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 360, 720, 960, 1440, 2160
Return Period(s) (years)	1, 2, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+40%					79.550
S2.000	SP16	15 Winter	100	+40%	1/15 Summer				80.033
S2.001	SP17	15 Winter	100	+40%	1/15 Summer				79.758
S2.002	S18	15 Winter	100	+40%	100/15 Summer				79.283
S1.001	S2	15 Winter	100	+40%					79.057
S1.002	S3	15 Winter	100	+40%					78.847
S3.000	SP19	15 Winter	100	+40%	1/15 Summer				79.794
S3.001	SP20	15 Winter	100	+40%	1/15 Summer				79.412
S3.002	S21	15 Winter	100	+40%	100/15 Summer				79.054
S1.003	S4	15 Winter	100	+40%					78.443
S1.004	S5	15 Winter	100	+40%	100/15 Summer				78.126
S4.000	SP22	15 Winter	100	+40%	1/15 Summer				79.205
S4.001	SP23	15 Winter	100	+40%	1/15 Summer				78.938
S4.002	S24	15 Winter	100	+40%					78.242

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.125	0.000	0.40			19.6	OK	
S2.000	SP16	0.493	0.000	1.28			10.2	FLOOD RISK	
S2.001	SP17	0.383	0.000	0.89		11	10.2	SURCHARGED	
S2.002	S18	0.078	0.000	1.57			10.1	SURCHARGED	
S1.001	S2	-0.093	0.000	0.63			38.7	OK	
S1.002	S3	-0.093	0.000	0.63		7	46.7	OK	
S3.000	SP19	0.714	0.000	1.74			11.9	FLOOD RISK	
S3.001	SP20	0.457	0.000	2.46		11	11.9	SURCHARGED	
S3.002	S21	0.129	0.000	1.14			11.8	SURCHARGED	
S1.003	S4	-0.077	0.000	0.76		6	58.6	OK	
S1.004	S5	0.096	0.000	1.06		3	59.5	SURCHARGED	
S4.000	SP22	0.480	0.000	1.32			9.7	FLOOD RISK	
S4.001	SP23	0.363	0.000	0.63		12	9.7	SURCHARGED	
S4.002	S24	-0.028	0.000	0.87			9.6	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.005	S6	15 Winter	100	+40%	100/15 Summer				77.802
S5.000	SP25	15 Winter	100	+40%	1/15 Summer				79.035
S5.001	SP26	15 Winter	100	+40%	1/15 Summer				78.611
S5.002	S27	15 Winter	100	+40%					78.004
S1.006	S7	60 Winter	100	+40%	100/15 Summer				77.356
S1.007	S8	60 Winter	100	+40%	30/120 Winter				77.258
S6.000	SP28	15 Winter	100	+40%	100/15 Summer				78.163
S6.001	SP29	60 Winter	100	+40%	1/15 Summer				77.834
S6.002	S30	60 Winter	100	+40%					77.292
S7.000	SP31	15 Winter	100	+40%	1/15 Summer				79.436
S7.001	SP32	15 Winter	100	+40%	1/15 Summer				79.361
S7.002	S33	15 Winter	100	+40%	100/15 Summer				78.645
S7.003	S34	15 Winter	100	+40%					78.510
S8.000	SP39	15 Winter	100	+40%	1/15 Summer				79.135
S8.001	SP40	15 Winter	100	+40%	1/15 Summer				79.059
S8.002	S41	15 Winter	100	+40%	100/15 Summer				78.572
S7.004	S35	15 Winter	100	+40%					78.500
S9.000	SP42	15 Winter	100	+40%	1/15 Summer				79.102
S9.001	SP43	15 Winter	100	+40%	1/15 Summer				79.060
S9.002	S44	15 Winter	100	+40%					78.520
S10.000	SP45	15 Winter	100	+40%	1/15 Summer				79.833
S10.001	SP46	15 Winter	100	+40%	1/15 Summer				79.380
S10.002	S47	15 Winter	100	+40%	100/15 Summer				78.663
S7.005	S36	15 Winter	100	+40%	100/15 Summer				78.495
S11.000	SP43	15 Winter	100	+40%	1/15 Summer				79.414
S11.001	SP44	15 Winter	100	+40%	1/15 Summer				79.186
S11.002	S45	15 Winter	100	+40%	100/15 Summer				78.539
S12.000	SP46	15 Winter	100	+40%	1/15 Summer				79.556
S12.001	SP46	15 Winter	100	+40%	1/15 Summer				79.361
S12.002	S48	15 Winter	100	+40%	100/15 Summer				78.481
S7.006	S37	15 Winter	100	+40%	100/15 Summer				78.392
S7.007	S38	15 Winter	100	+40%	100/15 Summer				78.069
S1.008	S9	60 Winter	100	+40%	30/60 Winter				77.140
S13.000	S54	60 Winter	100	+40%	30/360 Winter				77.135
S13.001	S55	2160 Summer	100	+40%					76.715
S14.000	SP58	15 Winter	100	+40%	100/15 Summer				77.622
S14.001	SP59	15 Winter	100	+40%	100/15 Summer				77.416
S14.002	S60	60 Winter	100	+40%	100/30 Winter				77.168
S13.002	S56	60 Winter	100	+40%	30/120 Winter				77.135
S15.000	SP61	15 Winter	100	+40%	1/15 Summer				77.566
S15.001	S62	15 Winter	100	+40%	1/15 Summer				77.394
S15.002	S63	60 Winter	100	+40%	30/15 Summer				77.179
S13.003	S57	60 Winter	100	+40%	30/60 Summer				77.134

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	S6	0.072	0.000	0.93		3	68.2	SURCHARGED	
S5.000	SP25	0.770	0.000	1.79			12.3	FLOOD RISK	
S5.001	SP26	0.476	0.000	1.38		11	12.2	SURCHARGED	
S5.002	S27	-0.031	0.000	0.80			12.2	OK	
S1.006	S7	0.230	0.000	0.74		5	59.0	SURCHARGED*	
S1.007	S8	0.483	0.000	0.88			58.2	SURCHARGED	
S6.000	SP28	0.213	0.000	1.10			10.1	FLOOD RISK	
S6.001	SP29	0.234	0.000	0.32		47	4.3	SURCHARGED	
S6.002	S30	-0.068	0.000	0.23			4.3	OK	
S7.000	SP31	0.336	0.000	1.44			7.4	SURCHARGED	
S7.001	SP32	0.295	0.000	0.40		11	7.4	SURCHARGED	
S7.002	S33	0.019	0.000	1.19			7.5	SURCHARGED	
S7.003	S34	-0.065	0.000	0.18			7.0	OK	
S8.000	SP39	0.285	0.000	0.91			7.4	SURCHARGED	
S8.001	SP40	0.294	0.000	0.61		11	7.4	SURCHARGED	
S8.002	S41	0.017	0.000	1.17			7.5	SURCHARGED	
S7.004	S35	0.000	0.000	0.32			18.6	SURCHARGED*	
S9.000	SP42	0.252	0.000	0.90		9	5.6	SURCHARGED	
S9.001	SP43	0.260	0.000	0.39			5.6	SURCHARGED	
S9.002	S44	-0.010	0.000	0.54			5.6	OK	
S10.000	SP45	0.783	0.000	2.62			11.5	FLOOD RISK	
S10.001	SP46	0.395	0.000	0.56		4	10.5	FLOOD RISK	
S10.002	S47	0.133	0.000	0.92			10.5	SURCHARGED	
S7.005	S36	0.165	0.000	0.85			39.2	SURCHARGED	
S11.000	SP43	0.564	0.000	2.21			10.4	FLOOD RISK	
S11.001	SP44	0.381	0.000	0.59		10	10.1	FLOOD RISK	
S11.002	S45	0.109	0.000	0.86			10.1	SURCHARGED	
S12.000	SP46	0.456	0.000	1.80			9.8	FLOOD RISK	
S12.001	SP46	0.321	0.000	0.37		3	8.5	SURCHARGED	
S12.002	S48	0.101	0.000	0.68			8.4	SURCHARGED	
S7.006	S37	0.212	0.000	1.02		4	55.9	SURCHARGED	
S7.007	S38	0.314	0.000	1.11			52.7	SURCHARGED	
S1.008	S9	0.645	0.000	0.10			111.2	SURCHARGED	
S13.000	S54	0.310	0.000	0.01			6.0	SURCHARGED	
S13.001	S55	0.000	0.000	0.00			1.6	SURCHARGED*	
S14.000	SP58	0.192	0.000	0.93			28.1	SURCHARGED	
S14.001	SP59	0.226	0.000	1.60			27.9	SURCHARGED	
S14.002	S60	0.123	0.000	0.48			16.8	SURCHARGED	
S13.002	S56	0.520	0.000	0.02			20.1	SURCHARGED	
S15.000	SP61	0.616	0.000	1.18			11.4	FLOOD RISK	
S15.001	S62	0.564	0.000	1.49		8	11.3	SURCHARGED	
S15.002	S63	0.574	0.000	1.59			7.1	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S13.003	S57	0.749	0.000	0.03			24.2	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.009	S10	60 Winter	100	+40%	30/30 Winter				77.133
S16.000	SP64	15 Winter	100	+40%	1/15 Summer				80.408
S16.001	SP65	15 Winter	100	+40%	1/15 Summer				80.173
S16.002	S66	15 Winter	100	+40%	30/15 Summer				79.684
S16.003	S67	15 Winter	100	+40%					79.199
S17.000	SP80	15 Winter	100	+40%	100/15 Summer				79.867
S17.001	SP81	15 Winter	100	+40%					79.709
S17.002	S82	15 Winter	100	+40%	100/15 Winter				79.309
S16.004	S68	15 Winter	100	+40%					79.085
S18.000	SP64	15 Winter	100	+40%	100/15 Summer				79.615
S18.001	SP65	15 Winter	100	+40%					79.430
S18.002	S85	15 Winter	100	+40%					79.260
S16.005	S69	15 Winter	100	+40%					78.916
S16.006	S70	60 Winter	100	+40%	100/60 Summer				77.152
S19.000	SP86	15 Winter	100	+40%	100/15 Summer				78.510
S19.001	SP87	15 Winter	100	+40%					78.212
S19.002	S88	15 Winter	100	+40%					77.786
S16.007	S71	60 Winter	100	+40%	100/30 Summer				77.150
S20.000	SP89	15 Winter	100	+40%	1/15 Summer				78.399
S20.001	SP90	15 Winter	100	+40%	1/15 Summer				78.286
S20.002	S91	60 Winter	100	+40%	100/60 Winter				77.160
S16.008	S72	2160 Summer	100	+40%					76.860
S21.000	SP92	15 Winter	100	+40%	1/15 Summer				78.063
S21.001	SP93	15 Winter	100	+40%	1/15 Summer				77.981
S21.002	S94	60 Winter	100	+40%	30/360 Winter				77.177
S16.009	S73	60 Winter	100	+40%	30/120 Winter				77.145
S22.000	SP95	15 Winter	100	+40%	1/15 Summer				77.515
S22.001	SP96	15 Winter	100	+40%	1/15 Summer				77.470
S22.002	S97	60 Winter	100	+40%	100/30 Winter				77.149
S16.010	S74	60 Winter	100	+40%	30/120 Winter				77.142
S23.000	SP98	15 Winter	100	+40%	1/15 Summer				78.050
S23.001	SP99	15 Winter	100	+40%	1/15 Summer				77.755
S23.002	S100	60 Winter	100	+40%	100/30 Summer				77.198
S16.011	S75	60 Winter	100	+40%	30/120 Winter				77.139
S24.000	SP101	15 Winter	100	+40%	1/15 Summer				77.718
S24.001	SP102	60 Winter	100	+40%	1/15 Summer				77.525
S24.002	S103	60 Winter	100	+40%	30/120 Winter				77.166
S16.012	S77	15 Summer	100	+40%					76.455
S25.000	SP104	60 Winter	100	+40%	30/15 Summer				77.495
S25.001	SP105	60 Winter	100	+40%	1/15 Summer				77.488
S25.002	S106	60 Winter	100	+40%	30/60 Winter				77.139
S16.013	S78	60 Winter	100	+40%	30/60 Summer				77.133
S26.000	SP107	15 Winter	100	+40%	30/15 Summer				77.525

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.009	S10	0.873	0.000	0.20			102.1	FLOOD RISK	
S16.000	SP64	0.683	0.000	1.90			13.1	FLOOD RISK	
S16.001	SP65	0.513	0.000	0.89		9	13.0	SURCHARGED	
S16.002	S66	0.304	0.000	2.30			13.0	SURCHARGED	
S16.003	S67	-0.111	0.000	0.49			21.7	OK	
S17.000	SP80	0.067	0.000	1.63			8.7	SURCHARGED	
S17.001	SP81	-0.051	0.000	0.47		6	8.7	OK	
S17.002	S82	0.014	0.000	1.04			8.8	SURCHARGED	
S16.004	S68	-0.065	0.000	0.83			36.2	OK	
S18.000	SP64	0.115	0.000	1.79			11.1	SURCHARGED	
S18.001	SP65	-0.020	0.000	0.98		6	11.2	OK	
S18.002	S85	-0.020	0.000	0.98			11.3	OK	
S16.005	S69	-0.139	0.000	0.31			53.5	OK*	
S16.006	S70	0.052	0.000	0.04			35.3	SURCHARGED	
S19.000	SP86	0.110	0.000	1.28			14.2	SURCHARGED	
S19.001	SP87	-0.028	0.000	0.86		6	14.3	OK	
S19.002	S88	-0.039	0.000	0.68			14.3	OK	
S16.007	S71	0.205	0.000	0.04			37.1	SURCHARGED	
S20.000	SP89	0.299	0.000	1.08			8.6	SURCHARGED	
S20.001	SP90	0.286	0.000	0.28		4	7.1	FLOOD RISK	
S20.002	S91	0.010	0.000	0.33			5.0	SURCHARGED	
S16.008	S72	0.000	0.000	0.01			5.0	SURCHARGED*	
S21.000	SP92	0.288	0.000	1.26			8.5	FLOOD RISK	
S21.001	SP93	0.266	0.000	0.24		7	6.1	FLOOD RISK	
S21.002	S94	0.272	0.000	0.58			4.5	SURCHARGED	
S16.009	S73	0.355	0.000	0.05			41.9	SURCHARGED	
S22.000	SP95	0.265	0.000	1.03			5.6	SURCHARGED	
S22.001	SP96	0.260	0.000	0.54		11	5.6	SURCHARGED	
S22.002	S97	0.104	0.000	0.20			3.2	SURCHARGED	
S16.010	S74	0.422	0.000	0.05			44.5	SURCHARGED	
S23.000	SP98	0.800	0.000	2.56			15.1	FLOOD RISK	
S23.001	SP99	0.550	0.000	1.07		2	13.8	FLOOD RISK	
S23.002	S100	0.208	0.000	0.59			8.9	SURCHARGED	
S16.011	S75	0.484	0.000	0.05			50.1	SURCHARGED	
S24.000	SP101	0.393	0.000	2.60			15.3	FLOOD RISK	
S24.001	SP102	0.245	0.000	0.22		56	4.9	FLOOD RISK	
S24.002	S103	0.536	0.000	0.42			4.9	SURCHARGED	
S16.012	S77	0.000	0.000	0.04			41.1	SURCHARGED*	
S25.000	SP104	0.170	0.000	0.68			3.8	FLOOD RISK	
S25.001	SP105	0.203	0.000	0.08		36	2.0	FLOOD RISK	
S25.002	S106	0.609	0.000	0.19			2.1	SURCHARGED	
S16.013	S78	0.748	0.000	0.06			55.6	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S26.000	SP107	0.275	0.000	2.18			10.5	FLOOD RISK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S26.001	SP108	60 Winter	100	+40%	2/15 Winter			
S26.002	S109	60 Winter	100	+40%	30/60 Winter			
S16.014	S79	15 Summer	100	+40%				
S27.000	S110	360 Winter	100	+40%	100/30 Summer			
S27.001	S111	360 Winter	100	+40%	100/60 Winter			
S1.010	S10	60 Winter	100	+40%	1/15 Summer		100/30 Summer	16
S1.011	S12	60 Winter	100	+40%				
S1.012	S13	60 Winter	100	+40%				
S1.013	S14	120 Winter	100	+40%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S26.001	SP108	77.420	0.220	0.000	0.15		58	3.6	FLOOD RISK
S26.002	S109	77.142	0.727	0.000	0.40			3.6	SURCHARGED
S16.014	S79	76.310	0.000	0.000	0.01			6.1	SURCHARGED*
S27.000	S110	76.954	0.877	0.000	0.00			0.0	FLOOD RISK*
S27.001	S111	76.954	0.477	0.000	0.01			8.8	FLOOD RISK*
S1.010	S10	77.127	1.792	0.000	0.79	150.8		10.5	FLOOD RISK
S1.011	S12	75.208	-0.052	0.000	0.76			10.5	OK
S1.012	S13	74.999	-0.071	0.000	0.54			10.3	OK
S1.013	S14	71.986	-0.074	0.000	0.51			10.4	OK

PN	US/MH Name	Level Exceeded
S26.001	SP108	
S26.002	S109	
S16.014	S79	
S27.000	S110	
S27.001	S111	
S1.010	S10	
S1.011	S12	
S1.012	S13	
S1.013	S14	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SNET 2.SWS

Pipe Sizes SW Export Manhole Sizes SW Export

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	10
Ratio R	0.313	Minimum Backdrop Height (m)	0.500
Maximum Rainfall (mm/hr)	550	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	975

Designed with Level Soffits

Network Design Table for SNET 2.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	45.638	0.450	101.4	0.032	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	7.971	0.165	48.3	0.017	5.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	2.036	0.170	12.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S2.002	3.293	0.055	59.9	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	15.817	0.285	55.5	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	12.650	0.345	36.7	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	59.26	5.59	79.450	0.032	0.0	0.0	0.5	1.30	51.6	5.6
S2.000	61.35	5.12	79.440	0.017	0.0	0.0	0.3	1.11	8.7	3.1
S2.001	61.28	5.13	79.275	0.017	0.0	0.0	0.3	2.25	17.6	3.1
S2.002	61.03	5.19	79.105	0.017	0.0	0.0	0.3	1.00	7.8	3.1
S1.001	58.62	5.74	78.925	0.064	0.0	0.0	1.0	1.76	70.0	11.2
S1.002	58.22	5.83	78.715	0.077	0.0	0.0	1.2	2.17	86.2	13.4

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.000	8.271	0.125	66.2	0.020	5.00	0.0	0.600	o	100	Pipe/Conduit	
S3.001	1.919	0.030	64.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S3.002	12.421	0.405	30.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	18.034	0.490	36.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	21.570	0.300	71.9	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	8.621	0.150	57.5	0.016	5.00	0.0	0.600	o	100	Pipe/Conduit	
S4.001	1.898	0.305	6.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S4.002	14.834	0.540	27.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.005	25.984	0.604	43.0	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	8.568	0.130	65.9	0.021	5.00	0.0	0.600	o	100	Pipe/Conduit	
S5.001	1.984	0.100	19.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S5.002	13.029	0.909	14.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.006	15.112	0.351	43.1	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.007	12.988	0.280	46.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3.000	61.23	5.15	78.980	0.020	0.0	0.0	0.3	0.95	7.4	3.6
S3.001	61.08	5.18	78.855	0.020	0.0	0.0	0.3	0.96	7.6	3.6
S3.002	60.40	5.33	78.825	0.020	0.0	0.0	0.3	1.40	11.0	3.6
S1.003	57.65	5.97	78.295	0.097	0.0	0.0	1.5	2.16	86.0	16.7
S1.004	56.73	6.20	77.805	0.110	0.0	0.0	1.7	1.54	61.4	18.6
S4.000	61.25	5.14	78.625	0.016	0.0	0.0	0.3	1.02	8.0	2.9
S4.001	61.20	5.15	78.475	0.016	0.0	0.0	0.3	3.12	24.5	2.9
S4.002	60.44	5.32	78.170	0.016	0.0	0.0	0.3	1.48	11.6	2.9
S1.005	55.91	6.42	77.505	0.134	0.0	0.0	2.0	2.00	79.5	22.3
S5.000	61.21	5.15	78.165	0.021	0.0	0.0	0.3	0.95	7.5	3.8
S5.001	61.12	5.17	78.035	0.021	0.0	0.0	0.3	1.74	13.7	3.8
S5.002	60.63	5.28	77.935	0.021	0.0	0.0	0.3	2.05	16.1	3.8
S1.006	55.44	6.55	76.901	0.166	0.0	0.0	2.5	2.00	79.5	27.4
S1.007	55.04	6.66	76.550	0.166	0.0	0.0	2.5	1.93	76.6	27.4

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.000	13.920	0.350	39.8	0.018	5.00	0.0	0.600	o	100	Pipe/Conduit	
S6.001	2.000	0.240	8.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S6.002	7.596	0.865	8.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.000	2.298	0.034	67.6	0.012	5.00	0.0	0.600	o	100	Pipe/Conduit	
S7.001	2.855	0.440	6.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.002	3.000	0.051	58.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.003	6.028	0.075	80.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.000	2.382	0.085	28.0	0.012	5.00	0.0	0.600	o	100	Pipe/Conduit	
S8.001	3.472	0.200	17.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S8.002	3.337	0.055	60.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.004	9.405	0.170	55.3	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
S9.000	2.424	0.050	48.5	0.009	5.00	0.0	0.600	o	100	Pipe/Conduit	
S9.001	3.115	0.270	11.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S9.002	5.294	0.200	26.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S10.000	10.562	0.065	162.5	0.019	5.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.000	61.03	5.19	77.850	0.018	0.0	0.0	0.3	1.23	9.6	3.3
S6.001	60.97	5.20	77.500	0.018	0.0	0.0	0.3	2.69	21.2	3.3
S6.002	60.75	5.25	77.260	0.018	0.0	0.0	0.3	2.62	20.6	3.3
S7.000	61.72	5.04	79.000	0.012	0.0	0.0	0.2	0.94	7.4	2.2
S7.001	61.65	5.06	78.966	0.012	0.0	0.0	0.2	3.06	24.0	2.2
S7.002	61.42	5.11	78.526	0.012	0.0	0.0	0.2	1.01	7.9	2.2
S7.003	61.09	5.17	78.350	0.012	0.0	0.0	0.2	1.46	58.0	2.2
S8.000	61.79	5.03	78.750	0.012	0.0	0.0	0.2	1.46	11.5	2.2
S8.001	61.64	5.06	78.665	0.012	0.0	0.0	0.2	1.86	14.6	2.2
S8.002	61.38	5.11	78.455	0.012	0.0	0.0	0.2	0.99	7.8	2.2
S7.004	60.69	5.26	78.275	0.033	0.0	0.0	0.5	1.76	70.1	6.0
S9.000	61.75	5.04	78.750	0.009	0.0	0.0	0.2	1.11	8.7	1.7
S9.001	61.64	5.06	78.700	0.009	0.0	0.0	0.2	2.29	18.0	1.7
S9.002	61.36	5.12	78.430	0.009	0.0	0.0	0.2	1.51	11.8	1.7
S10.000	60.55	5.29	78.950	0.019	0.0	0.0	0.3	0.60	4.7	3.4

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S10.001	2.597	0.455	5.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S10.002	4.138	0.200	20.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.005	14.786	0.150	98.6	0.014	0.00	0.0	0.600	o	225	Pipe/Conduit	
S11.000	5.902	0.045	131.2	0.017	5.00	0.0	0.600	o	100	Pipe/Conduit	
S11.001	2.111	0.375	5.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S11.002	5.162	0.250	20.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S12.000	5.815	0.060	96.9	0.016	5.00	0.0	0.600	o	100	Pipe/Conduit	
S12.001	2.137	0.660	3.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S12.002	2.480	0.200	12.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.006	27.456	0.350	78.4	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
S7.007	16.235	1.335	12.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.008	48.502	0.230	210.9	0.029	0.00	0.0	0.600	o	900	Pipe/Conduit	
S13.000	27.537	0.110	250.3	0.026	5.00	0.0	0.600	o	900	Pipe/Conduit	
S13.001	6.337	0.100	63.4	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S10.001	60.49	5.31	78.885	0.019	0.0	0.0	0.3	3.26	25.6	3.4
S10.002	60.31	5.35	78.430	0.019	0.0	0.0	0.3	1.71	13.4	3.4
S7.005	59.48	5.53	78.105	0.075	0.0	0.0	1.2	1.32	52.4	13.3
S11.000	61.23	5.15	78.750	0.017	0.0	0.0	0.3	0.67	5.3	3.1
S11.001	61.18	5.16	78.705	0.017	0.0	0.0	0.3	3.28	25.8	3.1
S11.002	60.94	5.21	78.330	0.017	0.0	0.0	0.3	1.71	13.4	3.1
S12.000	61.33	5.12	79.000	0.016	0.0	0.0	0.3	0.78	6.1	2.9
S12.001	61.29	5.13	78.940	0.016	0.0	0.0	0.3	4.33	34.0	2.9
S12.002	61.21	5.15	78.280	0.016	0.0	0.0	0.3	2.21	17.3	2.9
S7.006	58.17	5.84	77.955	0.123	0.0	0.0	1.9	1.48	58.8	21.3
S7.007	57.79	5.94	77.605	0.123	0.0	0.0	1.9	2.91	51.3	21.3
S1.008	53.73	7.04	75.595	0.336	0.0	0.0	4.9	2.15	1370.2	53.8
S13.000	60.83	5.23	75.925	0.026	0.0	0.0	0.4	1.98	1257.0	4.7
S13.001	60.71	5.26	75.815	0.026	0.0	0.0	0.4	3.94	2506.4	4.7

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S14.000	5.664	0.240	23.6	0.047	5.00	0.0	0.600	o	150	Pipe/Conduit	
S14.001	12.489	0.145	86.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S14.002	8.741	0.430	20.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S13.002	28.365	0.230	123.3	0.025	0.00	0.0	0.600	o	900	Pipe/Conduit	
S15.000	2.753	0.120	22.9	0.020	5.00	0.0	0.600	o	100	Pipe/Conduit	
S15.001	12.755	0.225	56.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S15.002	7.792	0.051	152.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S13.003	7.423	0.150	49.5	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S1.009	8.598	0.025	343.9	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S16.000	3.468	0.065	53.4	0.022	5.00	0.0	0.600	o	100	Pipe/Conduit	
S16.001	1.958	0.280	7.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.002	6.508	0.070	93.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.003	17.833	0.160	111.5	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S14.000	61.70	5.05	77.280	0.047	0.0	0.0	0.8	2.08	36.8	8.6
S14.001	60.81	5.24	77.040	0.047	0.0	0.0	0.8	1.08	19.1	8.6
S14.002	60.51	5.30	76.895	0.047	0.0	0.0	0.8	2.24	39.7	8.6
S13.002	59.76	5.47	75.715	0.098	0.0	0.0	1.6	2.82	1794.3	17.4
S15.000	61.78	5.03	76.850	0.020	0.0	0.0	0.3	1.62	12.7	3.7
S15.001	60.81	5.24	76.730	0.020	0.0	0.0	0.3	1.03	8.1	3.7
S15.002	59.87	5.45	76.505	0.020	0.0	0.0	0.3	0.62	4.9	3.7
S13.003	59.64	5.50	75.485	0.118	0.0	0.0	1.9	4.46	2837.3	21.0
S1.009	53.44	7.12	75.360	0.454	0.0	0.0	6.6	1.68	1071.2	72.3
S16.000	61.66	5.05	79.625	0.022	0.0	0.0	0.4	1.06	8.3	4.0
S16.001	61.61	5.07	79.560	0.022	0.0	0.0	0.4	2.94	23.1	4.0
S16.002	60.97	5.20	79.280	0.022	0.0	0.0	0.4	0.80	6.3	4.0
S16.003	59.89	5.44	79.085	0.037	0.0	0.0	0.6	1.24	49.2	6.6

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S17.000	3.601	0.040	90.0	0.014	5.00	0.0	0.600	o	100	Pipe/Conduit	
S17.001	3.441	0.465	7.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S17.002	5.994	0.145	41.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.004	7.640	0.095	80.4	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
S18.000	2.810	0.050	56.2	0.018	5.00	0.0	0.600	o	100	Pipe/Conduit	
S18.001	2.405	0.170	14.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S18.002	4.784	0.225	21.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.005	17.916	1.955	9.2	0.010	0.00	0.0	0.600	o	225	Pipe/Conduit	
S16.006	25.964	0.155	167.4	0.018	0.00	0.0	0.600	o	900	Pipe/Conduit	
S19.000	2.118	0.160	13.2	0.023	5.00	0.0	0.600	o	100	Pipe/Conduit	
S19.001	4.023	0.415	9.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S19.002	5.805	0.880	6.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.007	14.121	0.085	166.1	0.012	0.00	0.0	0.600	o	900	Pipe/Conduit	
S20.000	4.270	0.100	42.7	0.014	5.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S17.000	61.57	5.07	79.700	0.014	0.0	0.0	0.2	0.81	6.4	2.6
S17.001	61.47	5.09	79.660	0.014	0.0	0.0	0.2	2.86	22.5	2.6
S17.002	61.08	5.18	79.195	0.014	0.0	0.0	0.2	1.20	9.4	2.6
S16.004	59.50	5.53	78.925	0.060	0.0	0.0	1.0	1.46	58.0	10.6
S18.000	61.70	5.05	79.400	0.018	0.0	0.0	0.3	1.03	8.1	3.3
S18.001	61.61	5.06	79.350	0.018	0.0	0.0	0.3	2.06	16.2	3.3
S18.002	61.39	5.11	79.180	0.018	0.0	0.0	0.3	1.68	13.2	3.3
S16.005	59.21	5.60	78.830	0.088	0.0	0.0	1.4	4.35	172.9	15.5
S16.006	58.45	5.78	76.200	0.106	0.0	0.0	1.7	2.42	1538.9	18.5
S19.000	61.84	5.02	78.300	0.023	0.0	0.0	0.4	2.14	16.8	4.2
S19.001	61.71	5.04	78.140	0.023	0.0	0.0	0.4	2.50	19.6	4.2
S19.002	61.56	5.08	77.725	0.023	0.0	0.0	0.4	3.03	23.8	4.2
S16.007	58.05	5.87	76.045	0.141	0.0	0.0	2.2	2.43	1544.8	24.4
S20.000	61.63	5.06	78.000	0.014	0.0	0.0	0.2	1.18	9.3	2.6

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S20.001	2.299	0.850	2.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S20.002	3.204	0.290	11.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.008	11.814	0.070	168.8	0.004	0.00	0.0	0.600	o	900	Pipe/Conduit	
S21.000	3.227	0.060	53.8	0.014	5.00	0.0	0.600	o	100	Pipe/Conduit	
S21.001	1.871	0.810	2.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S21.002	5.496	0.115	47.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.009	12.062	0.070	172.3	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S22.000	3.481	0.040	87.0	0.009	5.00	0.0	0.600	o	100	Pipe/Conduit	
S22.001	4.136	0.165	25.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S22.002	2.545	0.325	7.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.010	10.660	0.065	164.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S23.000	3.134	0.045	69.6	0.025	5.00	0.0	0.600	o	100	Pipe/Conduit	
S23.001	2.404	0.215	11.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S23.002	3.935	0.335	11.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S20.001	61.59	5.07	77.900	0.014	0.0	0.0	0.2	4.74	37.2	2.6
S20.002	61.49	5.09	77.050	0.014	0.0	0.0	0.2	2.34	18.4	2.6
S16.008	57.72	5.96	75.960	0.159	0.0	0.0	2.5	2.41	1532.6	27.3
S21.000	61.68	5.05	77.675	0.014	0.0	0.0	0.2	1.05	8.3	2.6
S21.001	61.65	5.06	77.615	0.014	0.0	0.0	0.2	5.13	40.3	2.6
S21.002	61.26	5.14	76.805	0.014	0.0	0.0	0.2	1.12	8.8	2.6
S16.009	57.38	6.04	75.890	0.173	0.0	0.0	2.7	2.38	1516.7	29.6
S22.000	61.58	5.07	77.150	0.009	0.0	0.0	0.2	0.83	6.5	1.7
S22.001	61.37	5.11	77.110	0.009	0.0	0.0	0.2	1.55	12.2	1.7
S22.002	61.30	5.13	76.945	0.009	0.0	0.0	0.2	2.78	21.8	1.7
S16.010	57.09	6.11	75.820	0.182	0.0	0.0	2.8	2.44	1554.9	31.0
S23.000	61.65	5.06	77.150	0.025	0.0	0.0	0.4	0.92	7.3	4.6
S23.001	61.57	5.07	77.105	0.025	0.0	0.0	0.4	2.32	18.3	4.6
S23.002	61.43	5.10	76.890	0.025	0.0	0.0	0.4	2.27	17.8	4.6

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S16.011	33.083	0.200	165.4	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S24.000	2.188	0.045	48.6	0.026	5.00	0.0	0.600	o	100	Pipe/Conduit	
S24.001	2.039	0.650	3.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S24.002	2.072	0.175	11.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.012	11.153	0.070	159.3	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S25.000	2.683	0.040	67.1	0.011	5.00	0.0	0.600	o	100	Pipe/Conduit	
S25.001	2.105	0.755	2.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S25.002	2.297	0.145	15.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.013	12.387	0.075	165.2	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S26.000	6.401	0.050	128.0	0.018	5.00	0.0	0.600	o	100	Pipe/Conduit	
S26.001	2.052	0.785	2.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S26.002	2.118	0.105	20.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.014	11.742	0.070	167.7	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S16.011	56.22	6.34	75.755	0.207	0.0	0.0	3.2	2.43	1548.2	34.7
S24.000	61.76	5.03	77.225	0.026	0.0	0.0	0.4	1.11	8.7	4.8
S24.001	61.73	5.04	77.180	0.026	0.0	0.0	0.4	4.40	34.6	4.8
S24.002	61.65	5.06	76.530	0.026	0.0	0.0	0.4	2.26	17.7	4.8
S16.012	55.94	6.41	75.555	0.233	0.0	0.0	3.5	2.48	1577.6	38.8
S25.000	61.69	5.05	77.225	0.011	0.0	0.0	0.2	0.94	7.4	2.0
S25.001	61.66	5.06	77.185	0.011	0.0	0.0	0.2	4.67	36.7	2.0
S25.002	61.56	5.07	76.430	0.011	0.0	0.0	0.2	1.95	15.3	2.0
S16.013	55.62	6.50	75.485	0.244	0.0	0.0	3.7	2.44	1549.4	40.4
S26.000	61.18	5.16	77.150	0.018	0.0	0.0	0.3	0.68	5.3	3.3
S26.001	61.14	5.16	77.100	0.018	0.0	0.0	0.3	4.82	37.9	3.3
S26.002	61.05	5.18	76.315	0.018	0.0	0.0	0.3	1.73	13.6	3.3
S16.014	55.33	6.58	75.410	0.262	0.0	0.0	3.9	2.42	1537.3	43.2

Network Design Table for SNET 2.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S27.000	24.513	0.050	490.3	0.000	5.00	0.0	0.600	\/	-1	Pipe/Conduit	
S27.001	4.619	0.542	8.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.010	10.554	0.075	140.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.011	28.293	0.190	148.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.012	255.101	3.010	84.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.013	31.065	0.450	69.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S27.000	51.84	7.62	75.927	0.000	0.0	0.0	0.0	0.16	15.5	0.0
S27.001	51.81	7.62	75.877	0.000	0.0	0.0	0.0	8.37	2367.7	0.0
S1.010	51.18	7.83	75.185	0.716	0.0	0.0	9.9	0.85	14.9«	109.2
S1.011	49.52	8.41	75.110	0.716	0.0	0.0	9.9	0.82	14.5«	109.2
S1.012	41.01	12.30	74.920	0.716	0.0	0.0	9.9	1.09	19.3«	109.2
S1.013	40.30	12.73	71.910	0.716	0.0	0.0	9.9	1.21	21.4«	109.2

Conduit Sections for SNET 2.SWS

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m^2)
-1	\/	300	150	22.5		0.033	0.099

Free Flowing Outfall Details for SNET 2.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.013	S15	73.000	71.460	71.460	0	0

Simulation Criteria for SNET 2.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	32
Number of Online Controls	22	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.313		

Online Controls for SNET 2.SWS

Garastor Manhole: SP17, DS/PN: S2.001, Volume (m³): 0.3

Invert Level (m) 79.275 Model 300mm Overflow

Garastor Manhole: SP20, DS/PN: S3.001, Volume (m³): 0.3

Invert Level (m) 78.855 Model 300mm Overflow

Garastor Manhole: SP23, DS/PN: S4.001, Volume (m³): 0.3

Invert Level (m) 78.475 Model 300mm Overflow

Garastor Manhole: SP26, DS/PN: S5.001, Volume (m³): 0.3

Invert Level (m) 78.035 Model 300mm Overflow

Garastor Manhole: SP29, DS/PN: S6.001, Volume (m³): 0.3

Invert Level (m) 77.500 Model 300mm Overflow

Garastor Manhole: SP32, DS/PN: S7.001, Volume (m³): 0.2

Invert Level (m) 78.966 Model 300mm Overflow

Garastor Manhole: SP40, DS/PN: S8.001, Volume (m³): 0.2

Invert Level (m) 78.665 Model 300mm Overflow

Garastor Manhole: SP43, DS/PN: S9.001, Volume (m³): 0.2

Invert Level (m) 78.700 Model 300mm Overflow

Garastor Manhole: SP46, DS/PN: S10.001, Volume (m³): 0.3

Invert Level (m) 78.885 Model 300mm Overflow

Garastor Manhole: SP44, DS/PN: S11.001, Volume (m³): 0.2

Invert Level (m) 78.705 Model 300mm Overflow

Garastor Manhole: SP46, DS/PN: S12.001, Volume (m³): 0.2

Invert Level (m) 78.940 Model 300mm Overflow

Garastor Manhole: S62, DS/PN: S15.001, Volume (m³): 0.2

Invert Level (m) 76.730 Model 300mm Overflow

Garastor Manhole: SP65, DS/PN: S16.001, Volume (m³): 0.2

Invert Level (m) 79.560 Model 300mm Overflow

Garastor Manhole: SP90, DS/PN: S20.001, Volume (m³): 0.2

Invert Level (m) 77.900 Model 300mm Overflow

Garastor Manhole: SP93, DS/PN: S21.001, Volume (m³): 0.2

Invert Level (m) 77.615 Model 300mm Overflow

Garastor Manhole: SP96, DS/PN: S22.001, Volume (m³): 0.2

Invert Level (m) 77.110 Model 300mm Overflow

Garastor Manhole: SP99, DS/PN: S23.001, Volume (m³): 0.2

Invert Level (m) 77.105 Model 300mm Overflow

Garastor Manhole: SP102, DS/PN: S24.001, Volume (m³): 0.1

Invert Level (m) 77.180 Model 300mm Overflow

Garastor Manhole: SP105, DS/PN: S25.001, Volume (m³): 0.1

Invert Level (m) 77.185 Model 300mm Overflow

Garastor Manhole: SP108, DS/PN: S26.001, Volume (m³): 0.1

Invert Level (m) 77.100 Model 300mm Overflow

Non Return Valve Manhole: S111, DS/PN: S27.001, Volume (m³): 2.4

Crown Vortex Valve® Manhole: S10, DS/PN: S1.010, Volume (m³): 22.5

Design Head (m) 1.850 Vortex Valve® Type R1 SW Only Invert Level (m) 75.185
Design Flow (l/s) 10.5 Diameter (mm) 114

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.9	1.200	8.4	3.000	13.3	7.000	20.3
0.200	4.0	1.400	9.1	3.500	14.4	7.500	21.0
0.300	4.2	1.600	9.7	4.000	15.4	8.000	21.7
0.400	4.9	1.800	10.3	4.500	16.3	8.500	22.4
0.500	5.4	2.000	10.9	5.000	17.2	9.000	23.1
0.600	6.0	2.200	11.4	5.500	18.0	9.500	23.7
0.800	6.9	2.400	11.9	6.000	18.8		
1.000	7.7	2.600	12.4	6.500	19.6		

Offline Controls for SNET 2.SWS

Weir Manhole: S10, DS/PN: S1.010, Loop to PN: S27.001

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 76.950

Storage Structures for SNET 2.SWS

Porous Car Park Manhole: SP17, DS/PN: S2.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.7
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.800	Membrane Depth (mm)	0

Complex Manhole: S3, DS/PN: S1.002

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	12.7
Safety Factor	2.0	Slope (1:X)	36.7
Porosity	0.30	Cap Volume Depth (m)	0.979
Invert Level (m)	78.715	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	12.7
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	36.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	79.694	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Porous Car Park Manhole: SP20, DS/PN: S3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	12.3
Max Percolation (l/s)	16.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.500	Membrane Depth (mm)	0

Complex Manhole: S4, DS/PN: S1.003

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	18.0
Safety Factor	2.0	Slope (1:X)	36.8
Porosity	0.30	Cap Volume Depth (m)	1.136
Invert Level (m)	78.370	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	18.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	36.8
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	79.506	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: S5, DS/PN: S1.004

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	21.6
Safety Factor	2.0	Slope (1:X)	71.9
Porosity	0.30	Cap Volume Depth (m)	1.318
Invert Level (m)	77.880	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	21.6
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	71.9
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	79.198	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Porous Car Park Manhole: SP23, DS/PN: S4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.0
Membrane Percolation (mm/hr)	1000	Length (m)	8.0
Max Percolation (l/s)	8.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.140	Membrane Depth (mm)	0

Complex Manhole: S6, DS/PN: S1.005

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	22.0
Safety Factor	2.0	Slope (1:X)	63.4
Porosity	0.30	Cap Volume Depth (m)	1.304
Invert Level (m)	77.580	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	26.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	63.4
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	78.884	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Porous Car Park Manhole: SP26, DS/PN: S5.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	8.0
Membrane Percolation (mm/hr)	1000	Length (m)	8.0
Max Percolation (l/s)	17.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	78.725	Membrane Depth (mm)	0

Complex Manhole: S7, DS/PN: S1.006

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	15.1
Safety Factor	2.0	Slope (1:X)	25.6
Porosity	0.30	Cap Volume Depth (m)	1.335
Invert Level (m)	77.095	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	15.1
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	25.6
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	77.095	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Porous Car Park Manhole: SP29, DS/PN: S6.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.9
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	16.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.580	Membrane Depth (mm)	0

Porous Car Park Manhole: SP32, DS/PN: S7.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	13.0
Max Percolation (l/s)	10.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.565	Membrane Depth (mm)	0

Porous Car Park Manhole: SP40, DS/PN: S8.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	19.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.195	Membrane Depth (mm)	0

Porous Car Park Manhole: SP42, DS/PN: S9.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.8
Membrane Percolation (mm/hr)	1000	Length (m)	12.1
Max Percolation (l/s)	12.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.165	Membrane Depth (mm)	0

Porous Car Park Manhole: SP46, DS/PN: S10.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.5
Membrane Percolation (mm/hr)	1000	Length (m)	11.8
Max Percolation (l/s)	21.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.375	Membrane Depth (mm)	0

Porous Car Park Manhole: SP44, DS/PN: S11.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.7
Membrane Percolation (mm/hr)	1000	Length (m)	10.1
Max Percolation (l/s)	13.2	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.185	Membrane Depth (mm)	0

Porous Car Park Manhole: SP46, DS/PN: S12.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	11.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.340	Membrane Depth (mm)	0

Complex Manhole: S37, DS/PN: S7.006

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.2
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	27.5
Safety Factor	2.0	Slope (1:X)	99.8
Porosity	0.30	Cap Volume Depth (m)	0.936
Invert Level (m)	78.100	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	27.5
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	99.8
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	79.111	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S54, DS/PN: S13.000

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.5
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	25.6
Safety Factor	2.0	Slope (1:X)	250.0
Porosity	0.30	Cap Volume Depth (m)	1.480
Invert Level (m)	77.270	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	25.6
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	250.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	78.750	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: S56, DS/PN: S13.002

Infiltration Trench

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.5
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	23.6
Safety Factor	2.0	Slope (1:X)	102.7
Porosity	0.30	Cap Volume Depth (m)	1.733
Invert Level (m)	76.895	Cap Infiltration Depth (m)	0.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	24.6
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	102.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	78.628	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Porous Car Park Manhole: S62, DS/PN: S15.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.1
Max Percolation (l/s)	16.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.420	Membrane Depth (mm)	0

Porous Car Park Manhole: SP65, DS/PN: S16.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	7.6
Max Percolation (l/s)	10.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	80.210	Membrane Depth (mm)	0

Porous Car Park Manhole: SP81, DS/PN: S17.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	8.1
Max Percolation (l/s)	13.5	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	80.150	Membrane Depth (mm)	0

Porous Car Park Manhole: SP65, DS/PN: S18.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.6
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	21.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	79.940	Membrane Depth (mm)	0

Porous Car Park Manhole: SP87, DS/PN: S19.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	16.2
Max Percolation (l/s)	27.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	78.750	Membrane Depth (mm)	0

Porous Car Park Manhole: SP90, DS/PN: S20.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	11.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	78.250	Membrane Depth (mm)	0

Porous Car Park Manhole: SP93, DS/PN: S21.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.900	Membrane Depth (mm)	0

Porous Car Park Manhole: SP96, DS/PN: S22.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.8
Max Percolation (l/s)	8.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.765	Membrane Depth (mm)	0

Porous Car Park Manhole: SP99, DS/PN: S23.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.6
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	21.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.750	Membrane Depth (mm)	0

Porous Car Park Manhole: SP102, DS/PN: S24.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.7
Max Percolation (l/s)	29.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.300	Membrane Depth (mm)	0

Porous Car Park Manhole: SP105, DS/PN: S25.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.5
Membrane Percolation (mm/hr)	1000	Length (m)	9.4
Max Percolation (l/s)	11.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.285	Membrane Depth (mm)	0

Porous Car Park Manhole: SP108, DS/PN: S26.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.1
Membrane Percolation (mm/hr)	1000	Length (m)	8.8
Max Percolation (l/s)	17.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	77.150	Membrane Depth (mm)	0

Tank or Pond Manhole: S111, DS/PN: S27.001

Invert Level (m) 76.077

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	130.0	0.623	343.1	1.400	0.0	2.100	0.0
0.023	136.5	0.723	384.1	1.500	0.0	2.200	0.0
0.123	166.0	0.823	427.3	1.600	0.0	2.300	0.0
0.223	197.9	0.923	472.8	1.700	0.0	2.400	0.0
0.320	221.2	1.023	464.5	1.800	0.0	2.500	0.0
0.432	266.4	1.064	516.8	1.900	0.0		
0.523	303.8	1.300	0.0	2.000	0.0		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	32
Number of Online Controls	22	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.313
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 360, 720, 960, 1440, 2160
Return Period(s) (years)	100
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+20%					79.542
S2.000	SP16	15 Winter	100	+20%	100/15 Summer				79.917
S2.001	SP17	15 Winter	100	+20%	100/15 Summer				79.709
S2.002	S18	15 Winter	100	+20%	100/15 Summer				79.247
S1.001	S2	15 Winter	100	+20%					79.045
S1.002	S3	15 Winter	100	+20%					78.835
S3.000	SP19	15 Winter	100	+20%	100/15 Summer				79.634
S3.001	SP20	15 Winter	100	+20%	100/15 Summer				79.342
S3.002	S21	15 Winter	100	+20%					78.910
S1.003	S4	15 Winter	100	+20%					78.429
S1.004	S5	15 Winter	100	+20%					78.003
S4.000	SP22	15 Winter	100	+20%	100/15 Summer				79.094
S4.001	SP23	15 Winter	100	+20%	100/15 Summer				78.894
S4.002	S24	15 Winter	100	+20%					78.235

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.133	0.000	0.34			16.8	OK	
S2.000	SP16	0.377	0.000	1.11			8.8	FLOOD RISK	
S2.001	SP17	0.334	0.000	0.77		12	8.8	SURCHARGED	
S2.002	S18	0.042	0.000	1.36			8.8	SURCHARGED	
S1.001	S2	-0.105	0.000	0.54			33.3	OK	
S1.002	S3	-0.105	0.000	0.54		7	40.2	OK	
S3.000	SP19	0.554	0.000	1.51			10.3	FLOOD RISK	
S3.001	SP20	0.387	0.000	2.14		11	10.3	SURCHARGED	
S3.002	S21	-0.015	0.000	0.99			10.3	OK	
S1.003	S4	-0.091	0.000	0.66		6	50.6	OK	
S1.004	S5	-0.027	0.000	1.00		4	55.9	OK	
S4.000	SP22	0.369	0.000	1.14			8.4	FLOOD RISK	
S4.001	SP23	0.319	0.000	0.55		12	8.4	SURCHARGED	
S4.002	S24	-0.035	0.000	0.76			8.4	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.005	S6	15 Winter	100	+20%					77.706
S5.000	SP25	15 Winter	100	+20%	100/15 Summer				78.855
S5.001	SP26	15 Winter	100	+20%	100/15 Summer				78.537
S5.002	S27	15 Winter	100	+20%					77.997
S1.006	S7	15 Winter	100	+20%	100/15 Summer				77.229
S1.007	S8	120 Winter	100	+20%	100/15 Summer				77.139
S6.000	SP28	15 Winter	100	+20%	100/15 Summer				78.039
S6.001	SP29	60 Winter	100	+20%	100/15 Summer				77.816
S6.002	S30	60 Winter	100	+20%					77.288
S7.000	SP31	15 Winter	100	+20%	100/15 Summer				79.396
S7.001	SP32	15 Winter	100	+20%	100/15 Summer				79.341
S7.002	S33	15 Winter	100	+20%					78.626
S7.003	S34	15 Winter	100	+20%					78.411
S8.000	SP39	15 Winter	100	+20%	100/15 Summer				79.095
S8.001	SP40	15 Winter	100	+20%	100/15 Summer				79.039
S8.002	S41	15 Winter	100	+20%					78.541
S7.004	S35	15 Winter	100	+20%					78.391
S9.000	SP42	15 Winter	100	+20%	100/15 Summer				79.076
S9.001	SP43	15 Winter	100	+20%	100/15 Summer				79.044
S9.002	S44	15 Winter	100	+20%					78.478
S10.000	SP45	15 Winter	100	+20%	100/15 Summer				79.681
S10.001	SP46	15 Winter	100	+20%	100/15 Summer				79.353
S10.002	S47	15 Winter	100	+20%					78.502
S7.005	S36	15 Winter	100	+20%	100/15 Summer				78.378
S11.000	SP43	15 Winter	100	+20%	100/15 Summer				79.309
S11.001	SP44	15 Winter	100	+20%	100/15 Summer				79.142
S11.002	S45	15 Winter	100	+20%					78.396
S12.000	SP46	15 Winter	100	+20%	100/15 Summer				79.496
S12.001	SP46	15 Winter	100	+20%	100/15 Summer				79.344
S12.002	S48	15 Winter	100	+20%					78.359
S7.006	S37	15 Winter	100	+20%	100/15 Summer				78.277
S7.007	S38	15 Winter	100	+20%	100/15 Summer				77.964
S1.008	S9	120 Winter	100	+20%	100/30 Summer				77.085
S13.000	S54	120 Winter	100	+20%	100/30 Winter				77.082
S13.001	S55	2160 Summer	100	+20%					76.715
S14.000	SP58	15 Winter	100	+20%	100/15 Summer				77.483
S14.001	SP59	15 Winter	100	+20%	100/15 Summer				77.322
S14.002	S60	120 Winter	100	+20%	100/60 Winter				77.104
S13.002	S56	120 Winter	100	+20%	100/30 Summer				77.082
S15.000	SP61	15 Winter	100	+20%	100/15 Summer				77.367
S15.001	S62	15 Winter	100	+20%	100/15 Summer				77.231
S15.002	S63	120 Winter	100	+20%	100/15 Summer				77.103
S13.003	S57	120 Winter	100	+20%	100/15 Winter				77.081

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.005	S6	-0.024	0.000	0.91		2	66.5	OK	
S5.000	SP25	0.590	0.000	1.56			10.7	FLOOD RISK	
S5.001	SP26	0.402	0.000	1.21		11	10.6	SURCHARGED	
S5.002	S27	-0.038	0.000	0.70			10.6	OK	
S1.006	S7	0.103	0.000	0.99		3	78.7	SURCHARGED*	
S1.007	S8	0.364	0.000	0.49			32.6	SURCHARGED	
S6.000	SP28	0.089	0.000	0.97			8.9	FLOOD RISK	
S6.001	SP29	0.216	0.000	0.23		48	3.2	SURCHARGED	
S6.002	S30	-0.072	0.000	0.17			3.2	OK	
S7.000	SP31	0.296	0.000	1.24			6.4	SURCHARGED	
S7.001	SP32	0.275	0.000	0.35		11	6.4	SURCHARGED	
S7.002	S33	0.000	0.000	1.02			6.4	OK	
S7.003	S34	-0.164	0.000	0.17			6.4	OK	
S8.000	SP39	0.245	0.000	0.78			6.3	SURCHARGED	
S8.001	SP40	0.274	0.000	0.52		11	6.4	SURCHARGED	
S8.002	S41	-0.014	0.000	1.00			6.4	OK	
S7.004	S35	-0.109	0.000	0.29			17.1	OK*	
S9.000	SP42	0.226	0.000	0.77		9	4.8	SURCHARGED	
S9.001	SP43	0.244	0.000	0.33			4.8	SURCHARGED	
S9.002	S44	-0.052	0.000	0.46			4.8	OK	
S10.000	SP45	0.631	0.000	2.23			9.8	FLOOD RISK	
S10.001	SP46	0.368	0.000	0.52		11	9.8	SURCHARGED	
S10.002	S47	-0.028	0.000	0.85			9.7	OK	
S7.005	S36	0.048	0.000	0.79			36.4	SURCHARGED	
S11.000	SP43	0.459	0.000	1.90			8.9	FLOOD RISK	
S11.001	SP44	0.337	0.000	0.52		12	8.9	SURCHARGED	
S11.002	S45	-0.034	0.000	0.75			8.9	OK	
S12.000	SP46	0.396	0.000	1.55			8.4	FLOOD RISK	
S12.001	SP46	0.304	0.000	0.35		9	8.0	SURCHARGED	
S12.002	S48	-0.021	0.000	0.64			8.0	OK	
S7.006	S37	0.097	0.000	1.00		4	54.4	SURCHARGED	
S7.007	S38	0.209	0.000	1.08			51.3	SURCHARGED	
S1.008	S9	0.590	0.000	0.06			62.5	SURCHARGED	
S13.000	S54	0.257	0.000	0.00			3.7	SURCHARGED	
S13.001	S55	0.000	0.000	0.00			1.7	SURCHARGED*	
S14.000	SP58	0.053	0.000	0.80			24.4	SURCHARGED	
S14.001	SP59	0.132	0.000	1.40			24.3	SURCHARGED	
S14.002	S60	0.059	0.000	0.27			9.2	SURCHARGED	
S13.002	S56	0.467	0.000	0.01			13.9	SURCHARGED	
S15.000	SP61	0.417	0.000	1.06			10.3	FLOOD RISK	
S15.001	S62	0.401	0.000	1.35		10	10.2	SURCHARGED	
S15.002	S63	0.498	0.000	0.88			3.9	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S13.003	S57	0.696	0.000	0.02			16.8	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.009	S10	120 Winter	100	+20%	100/15 Summer				77.080
S16.000	SP64	15 Winter	100	+20%	100/15 Summer				80.268
S16.001	SP65	15 Winter	100	+20%	100/15 Summer				80.089
S16.002	S66	15 Winter	100	+20%	100/15 Summer				79.588
S16.003	S67	15 Winter	100	+20%					79.190
S17.000	SP80	15 Winter	100	+20%	100/15 Summer				79.837
S17.001	SP81	15 Winter	100	+20%					79.704
S17.002	S82	15 Winter	100	+20%					79.269
S16.004	S68	15 Winter	100	+20%					79.069
S18.000	SP64	15 Winter	100	+20%	100/15 Summer				79.570
S18.001	SP65	15 Winter	100	+20%					79.421
S18.002	S85	15 Winter	100	+20%					79.251
S16.005	S69	15 Winter	100	+20%					78.910
S16.006	S70	60 Winter	100	+20%					77.100
S19.000	SP86	15 Winter	100	+20%	100/15 Summer				78.438
S19.001	SP87	15 Winter	100	+20%					78.205
S19.002	S88	15 Winter	100	+20%					77.780
S16.007	S71	120 Winter	100	+20%	100/30 Winter				77.089
S20.000	SP89	15 Winter	100	+20%	100/15 Summer				78.356
S20.001	SP90	15 Winter	100	+20%	100/15 Summer				78.271
S20.002	S91	120 Winter	100	+20%					77.096
S16.008	S72	2160 Summer	100	+20%					76.860
S21.000	SP92	15 Winter	100	+20%	100/15 Summer				78.026
S21.001	SP93	15 Winter	100	+20%	100/15 Summer				77.966
S21.002	S94	120 Winter	100	+20%	100/30 Winter				77.101
S16.009	S73	120 Winter	100	+20%	100/30 Winter				77.087
S22.000	SP95	15 Winter	100	+20%	100/15 Summer				77.488
S22.001	SP96	15 Winter	100	+20%	100/15 Summer				77.454
S22.002	S97	120 Winter	100	+20%	100/60 Winter				77.090
S16.010	S74	120 Winter	100	+20%	100/30 Winter				77.086
S23.000	SP98	15 Winter	100	+20%	100/15 Summer				77.910
S23.001	SP99	15 Winter	100	+20%	100/15 Summer				77.699
S23.002	S100	120 Winter	100	+20%	100/30 Winter				77.104
S16.011	S75	120 Winter	100	+20%	100/30 Summer				77.084
S24.000	SP101	15 Winter	100	+20%	100/15 Summer				77.621
S24.001	SP102	60 Winter	100	+20%	100/15 Summer				77.503
S24.002	S103	120 Winter	100	+20%	100/30 Summer				77.093
S16.012	S77	2160 Summer	100	+20%					76.455
S25.000	SP104	60 Winter	100	+20%	100/15 Summer				77.469
S25.001	SP105	60 Winter	100	+20%	100/15 Summer				77.465
S25.002	S106	120 Winter	100	+20%	100/30 Summer				77.083
S16.013	S78	120 Winter	100	+20%	100/15 Winter				77.081
S26.000	SP107	15 Winter	100	+20%	100/15 Summer				77.443

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.009	S10	0.820	0.000	0.13			66.9	FLOOD RISK	
S16.000	SP64	0.543	0.000	1.64			11.3	FLOOD RISK	
S16.001	SP65	0.429	0.000	0.77		10	11.3	SURCHARGED	
S16.002	S66	0.208	0.000	2.00			11.3	SURCHARGED	
S16.003	S67	-0.120	0.000	0.43			18.8	OK	
S17.000	SP80	0.037	0.000	1.40			7.5	SURCHARGED	
S17.001	SP81	-0.056	0.000	0.40		6	7.4	OK	
S17.002	S82	-0.026	0.000	0.89			7.5	OK	
S16.004	S68	-0.081	0.000	0.72			31.2	OK	
S18.000	SP64	0.070	0.000	1.54			9.6	SURCHARGED	
S18.001	SP65	-0.029	0.000	0.84		6	9.6	OK	
S18.002	S85	-0.029	0.000	0.84			9.7	OK	
S16.005	S69	-0.145	0.000	0.27			46.1	OK*	
S16.006	S70	0.000	0.000	0.03			31.5	OK	
S19.000	SP86	0.038	0.000	1.10			12.2	SURCHARGED	
S19.001	SP87	-0.035	0.000	0.74		6	12.3	OK	
S19.002	S88	-0.045	0.000	0.58			12.3	OK	
S16.007	S71	0.145	0.000	0.02			21.5	SURCHARGED	
S20.000	SP89	0.256	0.000	0.93			7.4	SURCHARGED	
S20.001	SP90	0.271	0.000	0.25		3	6.4	FLOOD RISK	
S20.002	S91	-0.054	0.000	0.18			2.8	OK	
S16.008	S72	0.000	0.000	0.00			3.7	SURCHARGED*	
S21.000	SP92	0.251	0.000	1.08			7.3	FLOOD RISK	
S21.001	SP93	0.251	0.000	0.21		6	5.3	FLOOD RISK	
S21.002	S94	0.196	0.000	0.35			2.7	SURCHARGED	
S16.009	S73	0.297	0.000	0.03			26.0	SURCHARGED	
S22.000	SP95	0.238	0.000	0.89			4.8	SURCHARGED	
S22.001	SP96	0.244	0.000	0.46		11	4.8	SURCHARGED	
S22.002	S97	0.045	0.000	0.11			1.8	SURCHARGED	
S16.010	S74	0.366	0.000	0.03			27.2	SURCHARGED	
S23.000	SP98	0.660	0.000	2.16			12.7	FLOOD RISK	
S23.001	SP99	0.494	0.000	0.98		9	12.7	SURCHARGED	
S23.002	S100	0.114	0.000	0.33			4.9	SURCHARGED	
S16.011	S75	0.429	0.000	0.03			30.8	SURCHARGED	
S24.000	SP101	0.296	0.000	2.24			13.2	FLOOD RISK	
S24.001	SP102	0.223	0.000	0.17		60	3.8	FLOOD RISK	
S24.002	S103	0.463	0.000	0.29			3.4	SURCHARGED	
S16.012	S77	0.000	0.000	0.00			4.6	SURCHARGED*	
S25.000	SP104	0.144	0.000	0.58			3.2	FLOOD RISK	
S25.001	SP105	0.180	0.000	0.04		33	1.1	FLOOD RISK	
S25.002	S106	0.553	0.000	0.10			1.0	SURCHARGED	
S16.013	S78	0.696	0.000	0.04			35.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S26.000	SP107	0.193	0.000	1.88			9.0	FLOOD RISK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SNET 2.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S26.001	SP108	60 Winter	100	+20%	100/15 Summer			
S26.002	S109	120 Winter	100	+20%	100/15 Winter			
S16.014	S79	15 Summer	100	+20%				
S27.000	S110	360 Winter	100	+20%	100/30 Winter			
S27.001	S111	360 Winter	100	+20%	100/120 Summer			
S1.010	S10	120 Winter	100	+20%	100/15 Summer		100/30 Winter	15
S1.011	S12	120 Winter	100	+20%				
S1.012	S13	120 Winter	100	+20%				
S1.013	S14	120 Winter	100	+20%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S26.001	SP108	77.402	0.202	0.000	0.08		56	2.0	FLOOD RISK
S26.002	S109	77.082	0.667	0.000	0.19			1.8	SURCHARGED
S16.014	S79	76.310	0.000	0.000	0.01			5.6	SURCHARGED*
S27.000	S110	76.746	0.669	0.000	0.00			0.0	SURCHARGED*
S27.001	S111	76.746	0.269	0.000	0.01			7.6	FLOOD RISK*
S1.010	S10	77.077	1.742	0.000	0.78	92.9		10.4	SURCHARGED
S1.011	S12	75.207	-0.053	0.000	0.75			10.4	OK
S1.012	S13	74.999	-0.071	0.000	0.54			10.3	OK
S1.013	S14	71.985	-0.075	0.000	0.50			10.3	OK

PN	US/MH Name	Level Exceeded
S26.001	SP108	
S26.002	S109	
S16.014	S79	
S27.000	S110	
S27.001	S111	
S1.010	S10	
S1.011	S12	
S1.012	S13	
S1.013	S14	