

Surface Water Drainage Statement

Residential Development

Land south of Gardenhouse Lane

Rickinghall

Suffolk

IP22 1EA

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Rev 01

Prepared for

NAP Anglia Ltd

Surface Water Drainage Statement

Residential Development – Land south of Gardenhouse Lane, Rickingham, Suffolk

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1 Introduction

- 1.1 BLI Consulting Engineers Ltd have been commissioned by NAP Anglia Ltd to prepare a Surface Water Drainage Statement in accordance with the:
- National Planning Policy Framework (NPPF).
 - Flood Risk and Coastal Change Planning Practice Guidance (PPG).
 - Non-Statutory Technical Standards.
 - Suffolk County Council (SCC) Flood Risk Management Strategy.
- 1.2 The purpose of this statement is to allow for no reserve matters conditions to be applied to a possible grant of this planning permission as imposed as part of the Outline Planning Permission (Ref: 2798/16) granted by Mid Suffolk District Council.

Planning Condition 12 - ACTION REQUIRED CONCURRENTLY WITH THE SUBMISSION OF RESERVED MATTERS - SURFACE WATER DRAINAGE DETAILS

Concurrent with the submission of the first reserved matters application(s) a surface water drainage scheme shall be submitted to, and approved in writing by, the local planning authority. The scheme shall be in accordance with the approved FRA and include:

- a. Dimensioned plans and drawings of the surface water drainage scheme;*
- b. Further infiltration testing on the site in accordance with BRE 365 and the use of infiltration as the means of drainage if the infiltration rates and groundwater levels show it to be possible;*
- c. If the use of infiltration is not possible then modelling shall be submitted to demonstrate that the surface water runoff will be restricted to Q_{bar} or 2l/s/ha for all events up to the critical 1 in 100 year rainfall events including climate change as specified in the FRA;*
- d. Modelling of the surface water drainage scheme to show that the attenuation/infiltration features will contain the 1 in 100 year rainfall event including climate change;*

e. Modelling of the surface water conveyance network in the 1 in 30 year rainfall event to show no above ground flooding, and modelling of the volumes of any above ground flooding from the pipe network in a 1 in 100 year climate change rainfall event, along with topographic plans showing where the water will flow and be stored to ensure no flooding of buildings or offsite flows;

f. Topographical plans depicting all exceedance flowpaths and demonstration that the flows would not flood buildings or flow offsite, and if they are to be directed to the surface water drainage system then the potential additional rates and volumes of surface water must be included within the modelling of the surface water system;

The scheme shall be fully implemented as approved.

Reason - To prevent flooding by ensuring the satisfactory storage and disposal of surface water from the site for the lifetime of the development.

Planning Condition 13 - ACTION REQUIRED CONCURRENTLY WITH THE SUBMISSION OF RESERVED MATTERS - SURFACE WATER DRAINAGE DETAILS

Concurrent with submission of the first reserved matters application(s) details of the implementation, maintenance and management of the surface water drainage scheme shall be submitted to and approved in writing by the local planning authority. The strategy shall be implemented and thereafter managed and maintained in accordance with the approved details.

Reason - To ensure clear arrangements are in place for ongoing operation and maintenance of the disposal of surface water drainage.

Planning Condition 15 - ACTION REQUIRED PRIOR TO COMMENCEMENT OF DEVELOPMENT - CONSTRUCTION SURFACE WATER MANAGEMENT PLAN

No development shall commence until details of a construction surface water management plan detailing how surface water and storm water will be managed on the site during construction is submitted to and agreed in writing by the local planning authority. The construction surface water management plan shall be implemented and thereafter managed and maintained in accordance with the approved plan.

Reason - To ensure the development does not cause increased pollution of the watercourse in line with the River Basin Management Plan.

2 Development Details

Site Location

2.1 The application site is located:

- **Site Address:** – Land south of Gardenhouse Lane, Rickinghall, Suffolk
- **Post Code:** - IP22 1EA
- **Central Grid Reference:** – TM 04545 75166

2.2 Refer to Figure 2.1 below for site Location Plan.

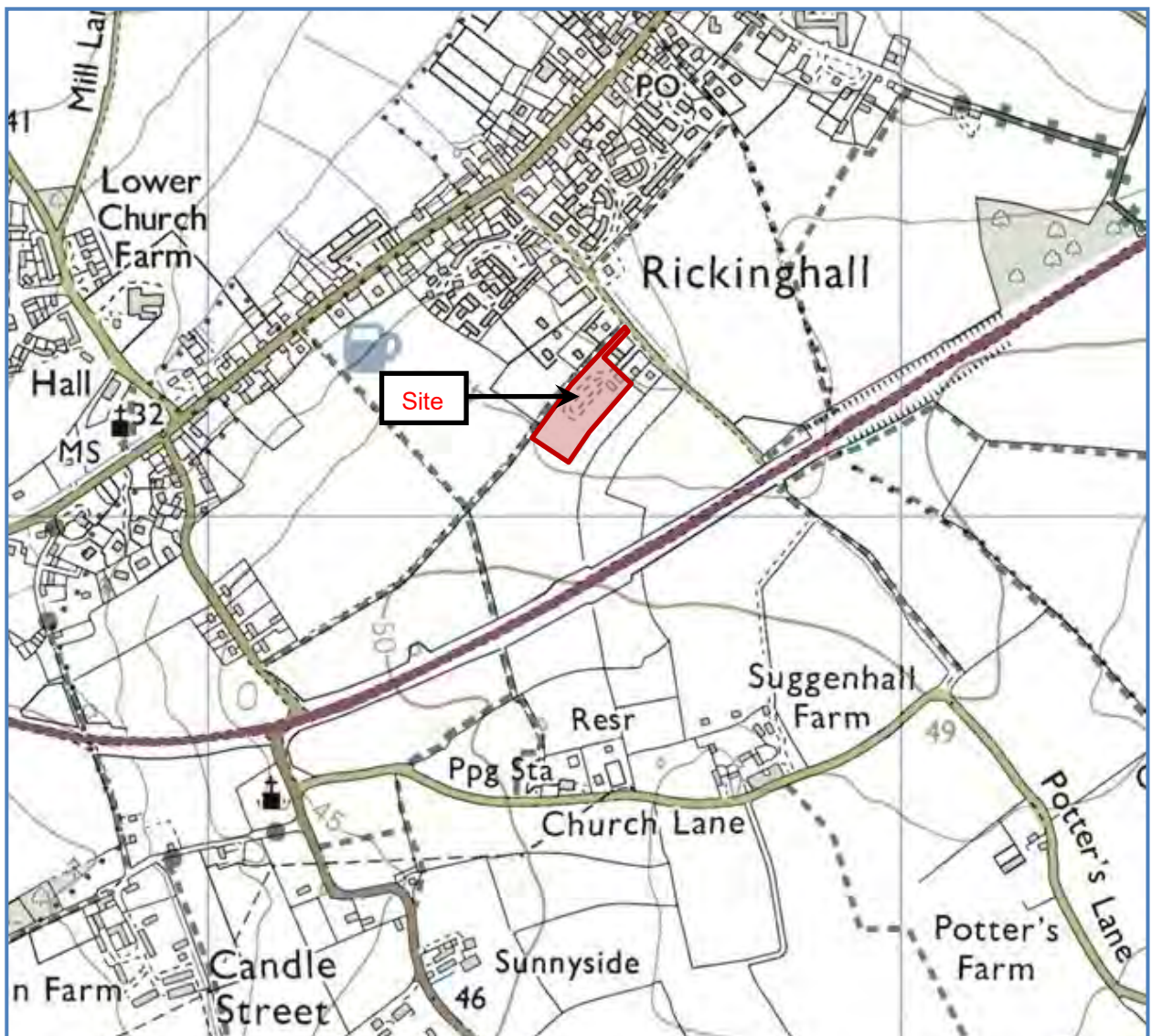


Figure 2.1 – Site Location Plan

Existing Site Layout

- 2.3 A topographical survey of the existing site layout has been undertaken by Plandescil Ltd and a copy of the survey has been included within Appendix B. The existing site layout intended for development currently comprises of a building yard with several outbuildings and areas of concrete hardstanding.
- 2.4 Vehicular and pedestrian access is currently achieved via a private road which forms a junction onto Gardenhouse Lane (adopted highway) to the north of the site, and also provides access to the existing residential dwelling known as Willowmere.
- 2.5 The site boundary as identified within Figure 2.1 above encloses an area of approximately 1.005 ha and the existing site layout has an impermeable area of approximately 0.182 ha as shown on the Impermeable Area Plan included within Appendix C
- 2.6 The above impermeable area is not served by a positive drainage network and the surface water runoff discharges onto the adjacent grassland which provides an enhancement to the sites natural greenfield runoff rates (urbanization).

Development Proposal

- 2.7 The proposed development as shown within Appendix D comprises of:
- The removal/demolition of the existing buildings and hardstanding areas.
 - The construction of 10No. residential dwellings with associated garages, driveways, and garden areas.
 - The construction of a private road leading off Gardenhouse Lane (adopted highway) to the northeast of the site via a newly constructed junction to the satisfaction of Suffolk County Council (Highways).
- 2.8 The development layout has an impermeable area of approximately 0.612 ha comprising of roof (0.218 ha) and hardstanding (0.394 ha) areas as detailed above and shown on the Impermeable Area Plan included within Appendix E.
- 2.9 Please note that the impermeable area includes an additional 10% to make allowance for the effects of Urban Creep over the lifetime of the development.

3 Surface Water Drainage Strategy

Existing Surface Water Runoff Rate

- 3.1 The site boundary encloses an area of approximately 1.005 ha and the majority of this area (0.823 ha) comprises of permeable grassland. The remainder of the site comprises of built development with an impermeable area of approximately 0.182 ha. The impermeable area is not served by a positive drainage system and the surface water runoff discharges onto the adjacent grassland providing an enhancement to the sites natural greenfield runoff rate (urbanization).
- 3.2 The existing greenfield runoff rates for the site are shown in Table 3.1 below and calculations included within Appendix F. The calculations have been undertaken using the IH 124 method and take into consideration the existing site conditions and urbanization.

Return Period	Existing Discharge Rate
1-year	3.4 l/s
30-year	8.8 l/s
100-year	12.0 l/s
QBar	4.0 l/s

Table 3.1 - Existing Greenfield Run-off Rates

- 3.3 The existing greenfield run-off volumes for the site are shown in Table 3.2 below and calculations included within Appendix F. The calculations have been undertaken using the FSSR method during a 360-minute storm duration and take into consideration the existing site conditions and urbanization.

Return Period	Existing Discharge Volume
1-year	65.5 m ³
30-year	153.4 m ³
100-year	210.9 m ³

Table 3.2 - Existing Greenfield Run-off Volumes

- 3.4 The proposed development will increase the impermeable area of the site when compared to the existing site layout. To ensure the proposed development does not exceed the existing discharge rates and volumes as stated within Table 3.1 and Table 3.2 above, adequate mitigation measures will be required as part of the proposed surface water drainage strategy.

Climate Change

- 3.5 In accordance with the Environment Agency's publication on climate change allowance, Table 1 provides advice in relation to changes to rainfall intensity as a result of future climate change.
- 3.6 For residential development, the potential changes anticipated up to the year 2115 range between:
- Upper Estimate = 40%
 - Central Estimate = 20%
- 3.7 As a precautionary approach, a 40% (Upper Estimate) increase in peak rainfall intensity has been incorporated into the design of the developments surface water drainage strategy to allow for the effects of climate change over the lifetime of the development.

Surface Water Drainage Strategy

- 3.8 In accordance with the surface water drainage hierarchy, infiltration drainage is the preferred method of surface water disposal.
- 3.9 Infiltration drainage was investigated as part of the original surface water drainage strategy undertaken by Evans Rivers and Coastal Ltd (Ref: 1806/RE/04-17/01). The surface water drainage strategy utilised soakaways and permeable paving construction and was approved by Suffolk County Council LLFA as part of the planning consultation.
- 3.10 Percolation Testing in accordance with BRE 365 was undertaken as part of the original surface water drainage statement and a copy of the test results have been included within Appendix G and a summary of the results provided below.
- TP1= 1.410×10^{-4} m/s @ 2.2m below ground level
 - TP2 = 1.920×10^{-4} m/s @ 2.2m below ground level
- 3.11 To obtain a more accurate understanding of the site geology and its potential for infiltration drainage techniques, additional Percolation Testing in accordance with BRE 365 has been undertaken across site. A copy of the test results have been included within Appendix H and a summary of the results provided below:
- TH01 = 1.516×10^{-5} m/s @ 1.50m below ground level

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- TH02 = 2.071×10^{-5} m/s @ 1.50m below ground level
- TH03 = 1.225×10^{-4} m/s @ 1.50m below ground level
- TH04 = 6.394×10^{-5} m/s @ 1.50m below ground level
- TH05 = 2.564×10^{-4} m/s @ 0.65m below ground level
- TH06 = 1.832×10^{-4} m/s @ 0.65m below ground level

3.12 The additional percolation tests included within Appendix H further support the use of infiltration drainage techniques in accordance with the original surface water drainage strategy undertaken by Evans Rivers and Coastal Ltd (Ref: 1806/RE/04-17/01).

3.13 In accordance with the approved drainage strategy, a surface water drainage layout and associated design calculations have been included within Appendix I and J, respectively.

3.14 The above design has been based on the following design criteria:

- The infiltration drainage system has been designed to contain the critical 100-year storm event with a 40% increase in rainfall intensity to allow for the effects of future climate change.
- As a precautionary approach, the lowest soil infiltration rate of 1.516×10^{-5} m/s has been used to undertake the design of the geo-cellular soakaway intended to serve the residential roof areas.
- As a precautionary approach, the lowest soil infiltration rate of 1.832×10^{-5} m/s has been used to undertake the design of the permeable paving construction intended to serve the private access road, driveways, and patio areas.
- A safety factor of 3.0 has been applied to all surface water design calculations
- The infiltration drainage system has been designed to have a half drain time of less than 1440 minute (1 day) during the critical 100-year (+40%) plus climate change storm event.
- The long-term maintenance and ownership of the infiltration drainage system has been established (refer to Section 5 of this report).

3.15 By utilising infiltration drainage techniques, the above drainage strategy will remove the urbanization of the existing site layout and reduce the surface water discharge rates and volumes back to the natural greenfield rates as shown in Tables 3.3 – 3.4 below and calculations included within Appendix K.

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Return Period	Existing Discharge Rate
1-year	2.5 l/s
30-year	6.9 l/s
100-year	10.2 l/s
QBar	2.9 l/s

Table 3.3 – Proposed Greenfield Run-off Rates

Return Period	Existing Discharge Volume
1-year	60.5 m ³
30-year	142.7 m ³
100-year	197.8 m ³

Table 3.4 – Proposed Greenfield Run-off Volumes

3.16 Therefore, the proposed development will reduce flood risk to the site and existing downstream development when compared to the existing site layout.

Pollution Control & Water Quality

3.17 As shown in Figure 3.1 below, the entire site is located within Source Protection Zone (SPZ) 3 which is also known as the Total Catchment. SPZ 3 is defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source.

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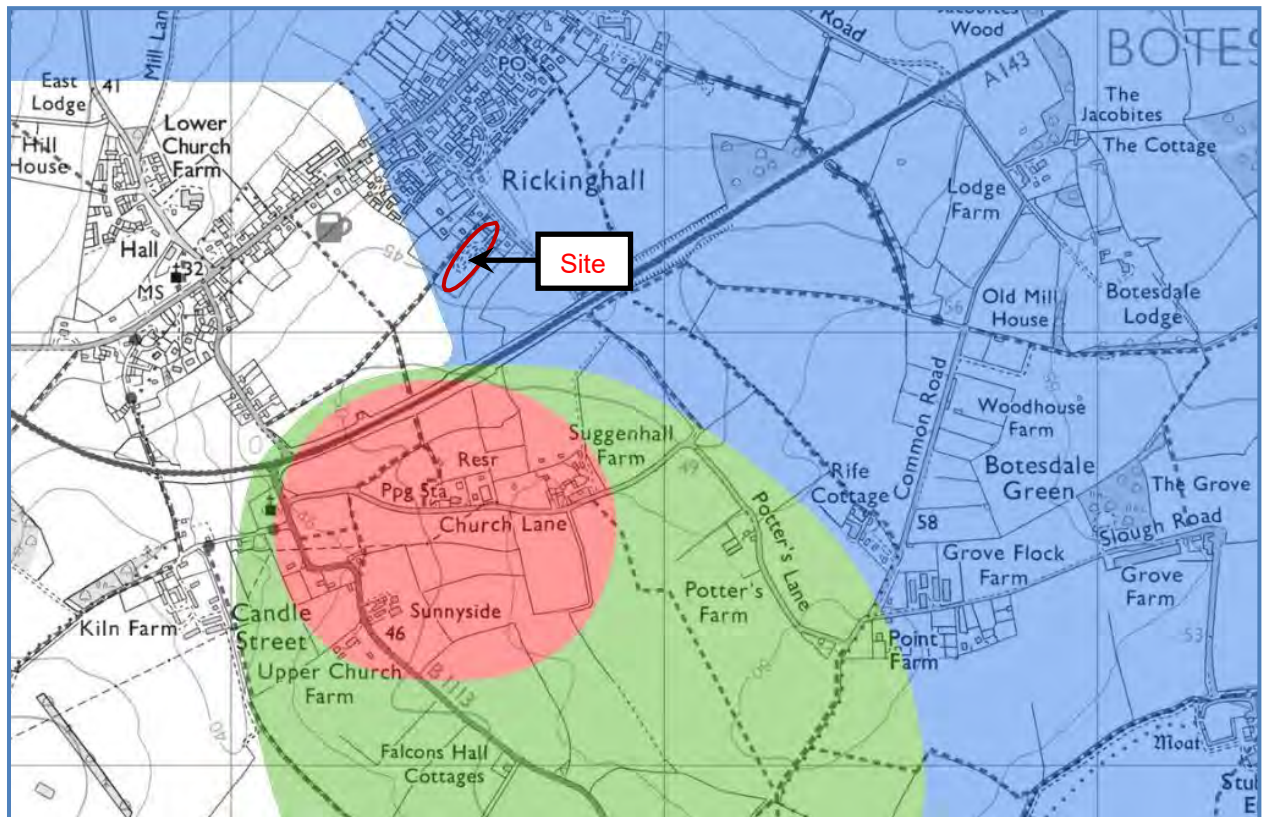


Figure 3.3 - Source Protection Zone

3.18 A water quality assessment in accordance with Section 26 of the CIRIA SuDS Manual has been undertaken for the different land uses across the proposed development as shown within Table 3.5 and Table 3.6 below.

Proposed Land Use & SuDS Mitigation	Total Suspended Solids	Metals	Hydro-carbons
Residential Roof Areas	- 0.20	- 0.20	- 0.05
Soakaway (with 300mm depth of suitable bedding layer)	+ 0.40	+ 0.30	+ 0.30
Total SuDS Mitigation	+ 0.20	+ 0.10	+ 0.25
Summary	ok	ok	ok

Table 3.5 – SuDS Mitigation Assessment of Residential Roof Areas

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Proposed Land Use & SuDS Mitigation	Total Suspended Solids	Metals	Hydro-carbons
Residential Driveways & Car Parking Areas	- 0.50	- 0.40	- 0.40
Permeable Paving Construction	+ 0.70	+ 0.60	+ 0.70
Total SuDS Mitigation	+ 0.20	+ 0.20	+ 0.30
Summary	ok	ok	ok

Table 3.6 – SuDS Mitigation Assessment of Residential Driveways & Car Parking Areas

- 3.19 The above assessment demonstrates that the proposed surface water drainage strategy has incorporated suitable SuDS Mitigation for all proposed land uses.

4 Construction Phase

- 4.1 To ensure the risk of surface water flooding is not temporarily increased during the construction phase, the following procedures / order of construction will be put in place.
- The permeable paving construction for the private road and driveways will include the construction of an impermeable base layer over the self-draining granular sub-base. The impermeable base layer will provide temporary access to the site for construction traffic and will then be cored as a later date prior to the laying of the permeable surface course. As a precautionary approach, the design of the permeable paving construction includes the installation of exceedance gully's which will direct high intensity rainfall events directly into the self-draining granular sub-base. The exceedance gully's will also direct runoff during the construction phase into the self-draining granular sub-base prior to the coring of the impermeable base layer. During construction, the exceedance gully's will include the temporary use of geo-textile filter meshes to prevent the entry of construction debris into the gully's and filtration units.
 - Prior to commencing the construction of each residential dwelling, the geo-cellular soakaway serving that dwelling will be fully installed. As the dwelling is constructed, it will be connected to the soakaway and will include the temporary use of geo-textile filter meshes to prevent construction debris entering the soakaway.
 - The permeable patio construction will not be constructed until the later stages of the development and will be self-draining from the initial construction phase with no additional mitigation required.
- 4.2 Following completion of the site development, a full inspection of the surface water drainage network will be undertaken to ensure all sediment and construction debris is removed.

5 Drainage Ownership & Maintenance Strategy

Ownership & Maintenance Responsibility

- 5.1 The private surface water drainage system will be under the ownership of the future occupants of the residential dwellings, and they will be solely responsible for the drainage systems future maintenance and repair.
- 5.2 The maintenance works associated with the drainage system will be undertaken as below:
- Where the surface water drainage system serves a single property, the future occupant of that property will be solely responsible for the maintenance of that part of the drainage system.
 - Where the surface water drainage system serves two or more properties then the occupants of those properties will have equal responsibility for the maintenance and the use of a private management company will be used (this mainly applies to the shared access road).
- 5.3 In the event of the property being sold in the future, the maintenance responsibility together with all maintenance documentation will be transferred to any future owners.

Maintenance Regime

- 5.4 The maintenance regime for the surface water drainage system has been undertaken in accordance with CIRIA 753 The SuDS Manual and is set out within Table 5.1 to Table 5.3 below.

Surface Water Drainage Network		
Required Maintenance	Typical Frequency	Works Undertaken
Inspection & Monitoring of the surface water drainage network including inspection chamber, pipework, and catchpit gully's.	Monthly for 12 months following installation to understand rate of sediment build-up. Then annually as a minimum or more frequently if the rate of sediment build-up dictates.	Occupants and/or Management Company
Inspection & clearance of the gutters and filter meshes.	Annually as a minimum or more frequently if the rate of sediment build-up dictates.	Occupants

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Inspection and removal of litter and other debris (leaves) from the drainage catchment, including roads, car parks and soft landscaping areas.	As required (approximately twice a year)	Occupants and/or Management Company
Maintain adjacent vegetation such as pruning of bushes, removal of nuisance plants and grass cutting.	As required (approximately twice a year)	Occupants and/or Management Company
Arrange repair works to any damaged areas of the surface water drainage network.	Depending on observations made during the inspection and monitoring of the drainage network.	Specialist Contractor overseen by Occupants and/or Management Company.

Table 5.1 – Surface Water Drainage System Maintenance Plan

Permeable Paving Construction		
Require Maintenance	Typical Frequency	Works Undertaken
Inspection & Monitoring	<p>Monthly for 3 months following installation.</p> <p>Then two further inspections at 3-month intervals and/or within 48hr after a large storm event.</p> <p>During programmed maintenance works as detailed below.</p>	<p>Contractor Initially</p> <p>Occupants and/or Management Company</p>
Brushing and vacuuming (standard cosmetic sweep over whole surface) of permeable paving construction and adjacent sub-catchment.	As required (approximately once a year) based on site-specific observations of clogging.	Occupants and/or Management Company
Removal of weeds and management of their return using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required (approximately once a year) based on site-specific observations of weed growth.	Occupants and/or Management Company
Maintain adjacent vegetation such as pruning of bushes and cutting of grass.	As required (approximately twice a year)	Occupants and/or Management Company

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Undertake remedial works to any depressions and rutting considered detrimental to the structural performance of the permeable paving construction or a hazard to users.	As required	Specialist Contractor overseen by Occupants and/or Management Company
Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)	Specialist Contractor overseen by Occupants and/or Management Company

Table 5.2 – Permeable Paving Maintenance Plan

Geo-Cellular Soakaway		
Require Maintenance	Typical Frequency	Works Undertaken
Inspect/check all inlets, outlets, and vents associated with the geo-cellular soakaway to ensure they are in good condition and operating as designed. If required, take remedial action such as sediment removal and repair.	Annually or more frequent if required.	Occupants and/or Management Company
Survey the inside of the geo-cellular soakaway for sediment build-up and remove if necessary.	Every 5 year or more frequent if required.	Specialist Contractor overseen by Occupants and/or Management Company
Reconstruct the soakaway if performance deteriorates or the geo-textile layer becomes clogged.	As required	Specialist Contractor overseen by Occupants and/or Management Company

Table 5.3 – Geo-cellular Soakaway Maintenance Plan

- 5.5 The maintenance regime recommended above is put in place to minimise the risk of blockages occurring and to prevent water surcharging from the inspection chambers and manholes.
- 5.6 The above maintenance plan should be considered as a live document and should be updated over the lifetime of the development and adapted where necessary to ensure a system failure does not occur and the risk of flooding is minimised.

6 Discussion and Conclusion

6.1 This Surface Water Drainage Statement has been undertaken in accordance with the:

- National Planning Policy Framework (NPPF).
- Flood Risk and Coastal Change Planning Practice Guidance (PPG).
- Non-Statutory Technical Standards.
- Suffolk County Council (SCC) Flood Risk Management Strategy.

6.2 The report demonstrates that:

- In accordance with the surface water drainage hierarchy, the proposed development will discharge its surface water runoff via infiltration drainage techniques.
- The design of the surface water drainage system has been undertaken to ensure the risk of flooding and pollution will not be increased and where possible the risk has been reduced.
- The future ownership of the surface water drainage system has been established and an appropriate site-specific management strategy has been undertaken.

Therefore, the surface water drainage design put forward as part of this statement is considered to satisfy the requirements of Planning Conditions 12, 13 and 15 imposed as part of the Outline Planning Consent (Ref: 2798/16) granted by Mid Suffolk District Council.

Appendices

Appendix A

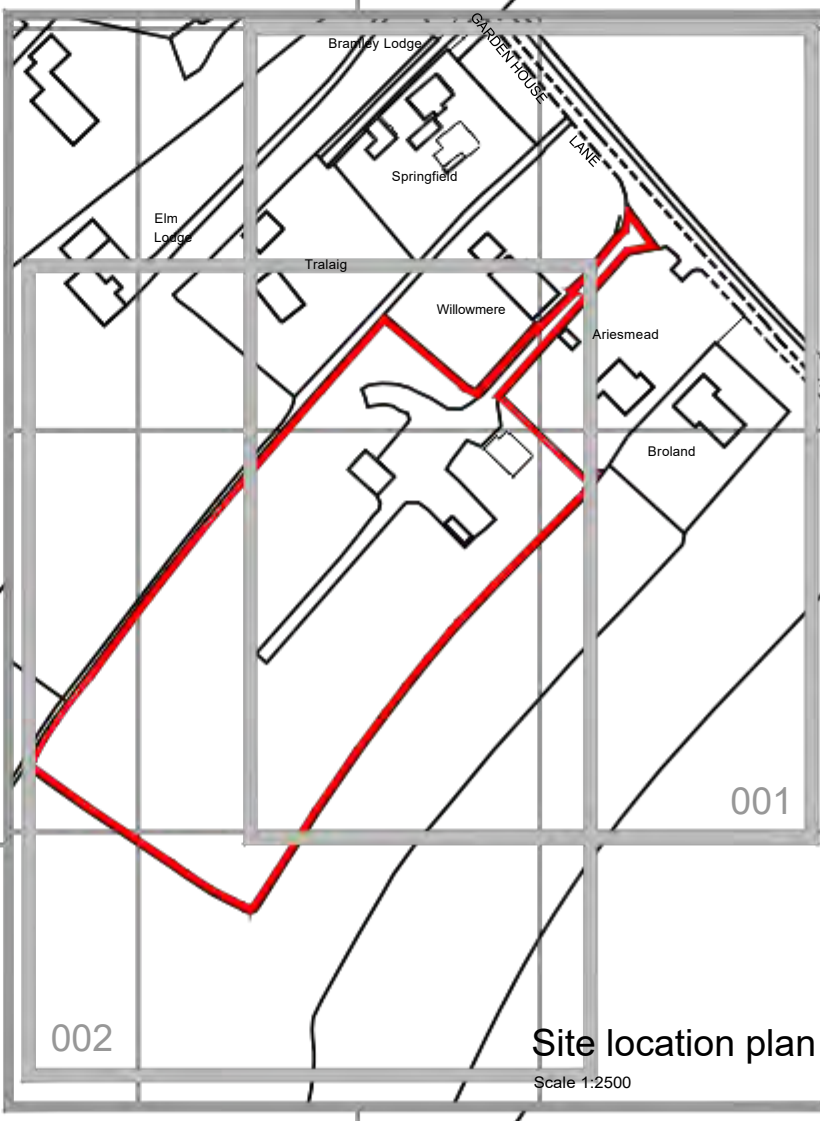
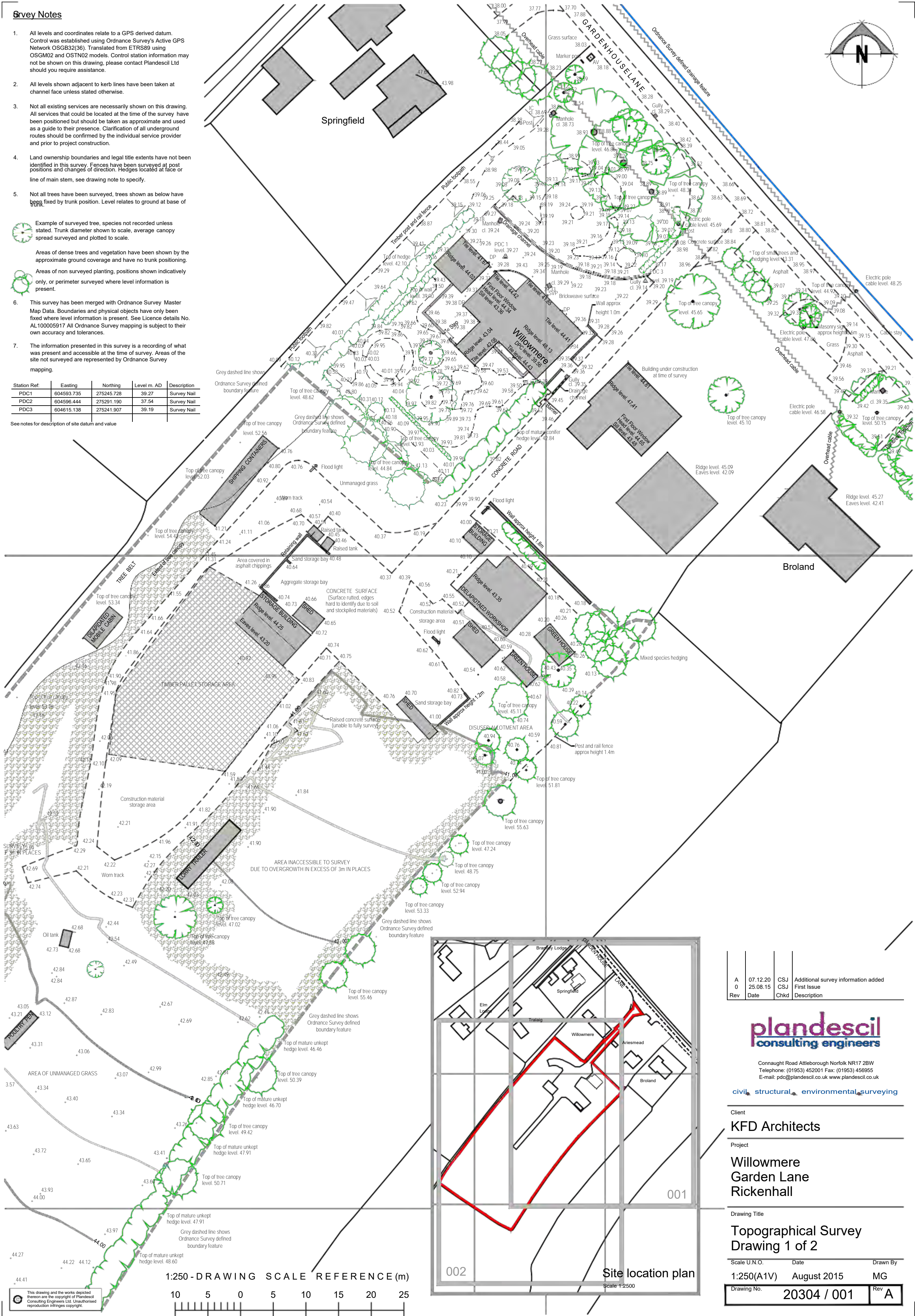
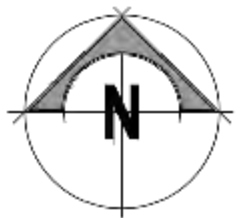
Existing Site Layout (Topographical Survey)

Survey Notes

- All levels and coordinates relate to a GPS derived datum. Control was established using Ordnance Survey's Active GPS Network OSGB32(36). Translated from ETRS89 using OSGM02 and OSTN02 models. Control station information may not be shown on this drawing, please contact Plandescil Ltd should you require assistance.
 - All levels shown adjacent to kerb lines have been taken at channel face unless stated otherwise.
 - Not all existing services are necessarily shown on this drawing. All services that could be located at the time of the survey have been positioned but should be taken as approximate and used as a guide to their presence. Clarification of all underground routes should be confirmed by the individual service provider and prior to project construction.
 - Land ownership boundaries and legal title extents have not been identified in this survey. Fences have been surveyed at post positions and changes of direction. Hedges located at face or line of main stem, see drawing note to specify.
 - Not all trees have been surveyed, trees shown as below have been fixed by trunk position. Level relates to ground at base of trunk.
- Example of surveyed tree, species not recorded unless stated. Trunk diameter shown to scale, average canopy spread surveyed and plotted to scale.
- Areas of dense trees and vegetation have been shown by the approximate ground coverage and have no trunk positioning.
- Areas of non surveyed planting, positions shown indicatively only, or perimeter surveyed where level information is present.
- This survey has been merged with Ordnance Survey Master Map Data. Boundaries and physical objects have only been fixed where level information is present. See Licence details No. AL10005917 All Ordnance Survey mapping is subject to their own accuracy and tolerances.
 - The information presented in this survey is a recording of what was present and accessible at the time of survey. Areas of the site not surveyed are represented by Ordnance Survey mapping.

Station Ref	Easting	Northing	Level m. AD	Description
PDC1	604593.735	275245.728	39.27	Survey Nail
PDC2	604596.444	275291.190	37.54	Survey Nail
PDC3	604615.138	275241.907	39.19	Survey Nail

See notes for description of site datum and value



A	07.12.20	CSJ	Additional survey information added
0	25.08.15	CSJ	First Issue
Rev	Date	Chkd	Description



Connaught Road Attleborough Norfolk NR17 2BW
 Telephone: (01953) 452001 Fax: (01953) 456955
 E-mail: pdc@plandescil.co.uk www.plandescil.co.uk

civil structural environmental surveying

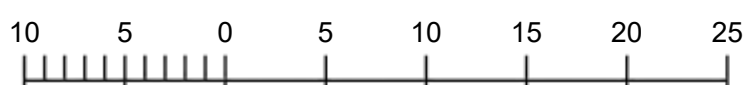
Client
KFD Architects

Project
**Willowmere
 Garden Lane
 Rickenhall**

Drawing Title
**Topographical Survey
 Drawing 1 of 2**

Scale U.N.O.	Date	Drawn By
1:250(A1V)	August 2015	MG
Drawing No.	20304 / 001	Rev A

1:250 - DRAWING SCALE REFERENCE (m)



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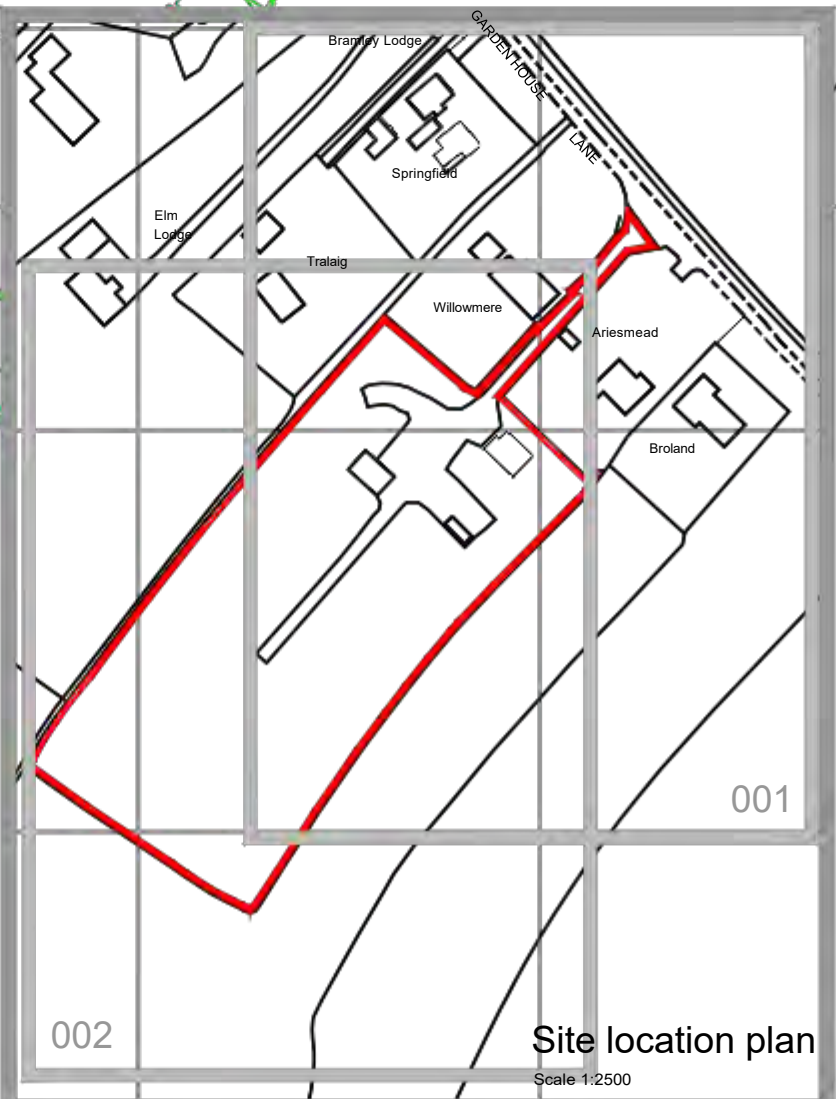
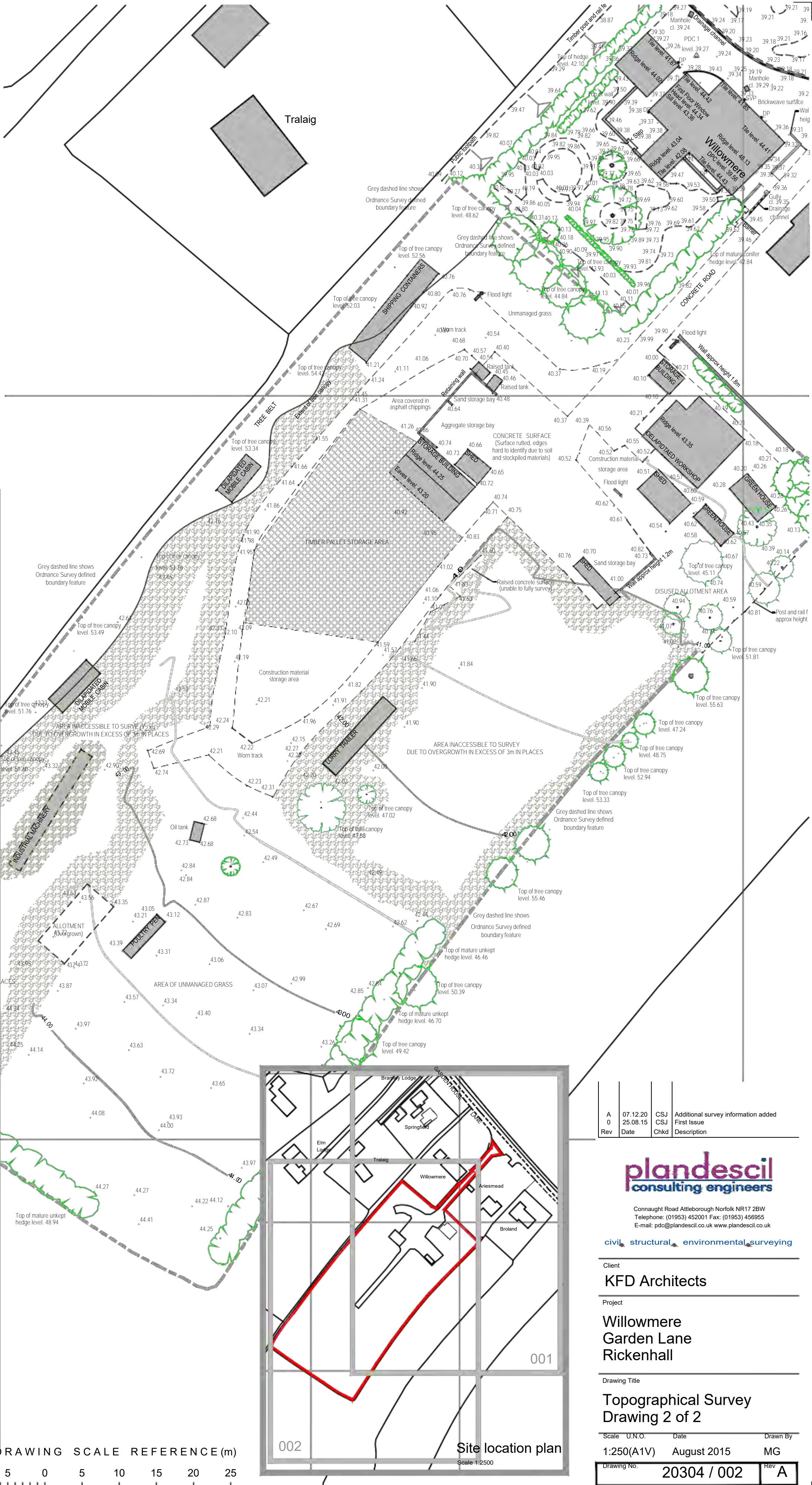
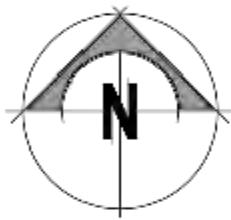
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See notes for description of site datum and value



Rev	Date	Chkd	Description
A	07.12.20	CSJ	Additional survey information added
0	25.08.15	CSJ	First Issue

plandescil
consulting engineers

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civil structural environmental surveying

Client
KFD Architects

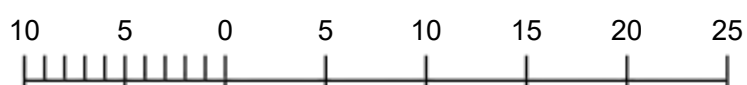
Project
**Willowmere
Garden Lane
Rickenhall**

Drawing Title
**Topographical Survey
Drawing 2 of 2**

Scale U.N.O. Date Drawn By
1:250(A1V) August 2015 MG

Drawing No. **20304 / 002** Rev **A**

1:250 - DRAWING SCALE REFERENCE (m)



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Surface Water Drainage Statement

Residential Development – Land south of Gardenhouse Lane, Rickingham, Suffolk



Appendix B

Existing Impermeable Area Plan

Surface Water Drainage Statement

Residential Development – Land south of Gardenhouse Lane, Rickingham, Suffolk



Appendix C

Proposed Development Layout



KEY

- Boundary line
- Existing post & rail fencing
- Proposed close boarded timber fencing with min. 150x150mm hedgehog hole to each plot
- Proposed timber post & rail fencing
- Permeable tarmac access road & private driveways / turning areas
- Permeable paving to paths & patios: 900X600mm golden fossil sandstone paving laid in stack bond
- Planted beds & borders - mixed low maintenance, drought tolerant perennials and grasses
- Gardens (turfed or grass seeded) - 'family lawn' mix (see planting notes in general notes below)
- Planted buffer strips to boundaries - mixed shrubs e.g. viburnum, sarcozza, cornus. etc.
- Bin store with living green roof (see schedule drawings for details)
- Proposed new planting
- Proposed new native tree - e.g. birch, wild cherry, crabapple, hazel, holly (see planting notes in general notes below)
- Proposed new native hedging - mixed native hedge (hawthorn 30%, blackthorn 25%, holly 25%, viburnum 10%, hazel 10%) to be protected by post & rail fence
- Existing hedge retained
- Existing tree to be retained (see Arboriculturalist's report & method statement for details)
- Existing hedge to be removed
- Existing tree to be removed (see Arboriculturalist's report for details)

general notes - Planting
 All plants to conform to BS 3936 and be free from pests, disease, discolouration and deformity. All plants to be supplied by nurseries registered with the HTA Nursery Certification Scheme. All tree & shrub planting, and turfing, to be carried out in accordance with BS 3936 4428.

Trees and shrubs to be planted in the first planting season (October to March) following completion of the development, avoiding frost or water-logged conditions. Existing vegetation to be cleared from planting areas before digging. Planting areas to be topsoiled (300mm min.) over cleared areas. Planting areas to be watered thoroughly after planting and 50mm depth of mulch applied.

Trees and shrub plants to be planted in pits equal in depth and 50% wider than the root system. Glazed edges to be broken up using a fork as necessary. Backfill with friable soil to the height of the root collar in layers, firming gently. Top-soil, if required,

to be screened. Hedge plants to be planted using 'T' or 'L' notch, in a double row, staggered, 450mm between rows and at 450mm centres. Exact locations of shrubs and trees are subject to below ground services. Contractor/engineers to ensure species and locations are acceptable in relation to underground services and compliance with NHBC 4.2.

exiSting treeS & Hedges
 Existing hedges and trees are to be adequately protected during construction – refer to Arboricultural Impact Assessment & Method Statement by Oakfield Arboricultural Services ref. OAS 21-191-AR01 for details of existing trees, tree constraints, and proposed canopy and root protection plan.

grASS to gardens
 Grass to front and rear amenity areas to be "Family Lawn" characteristics with rye grasses and fescues. Apply topsoil to at least 150mm in depth, remove weeds and stones etc. and rake to a rough level. Generally compact, fill low spots. Apply

a general fertilizer to the manufacturer's instructions. Mix thoroughly into top 50mm. Rake over to fine tilth. Lay turf 'brick' pattern tamp or roll lightly on completion. Immediately irrigate and keep turf moist for first two-three weeks. Mow regularly but not for first 4 weeks.

5 year Management Plan
 Following the implementation of the above recommendations, the following management is proposed:

YEAR 1 - Shrubs and hedges only to be watered with 10 litres/ m² if especially dry at the time of planting and/or following extended periods without rainfall (4 weeks) to avoid waterlogging. Shrubs to have 500mm mulch circles around each plant. Mulch to be composted organic matter to ensure a weed-free environment and to aid establishment. Mulch to be applied to a depth of 150mm but must be kept clear of stem bases. Mulch levels to be maintained at this depth for 2 years after planting.

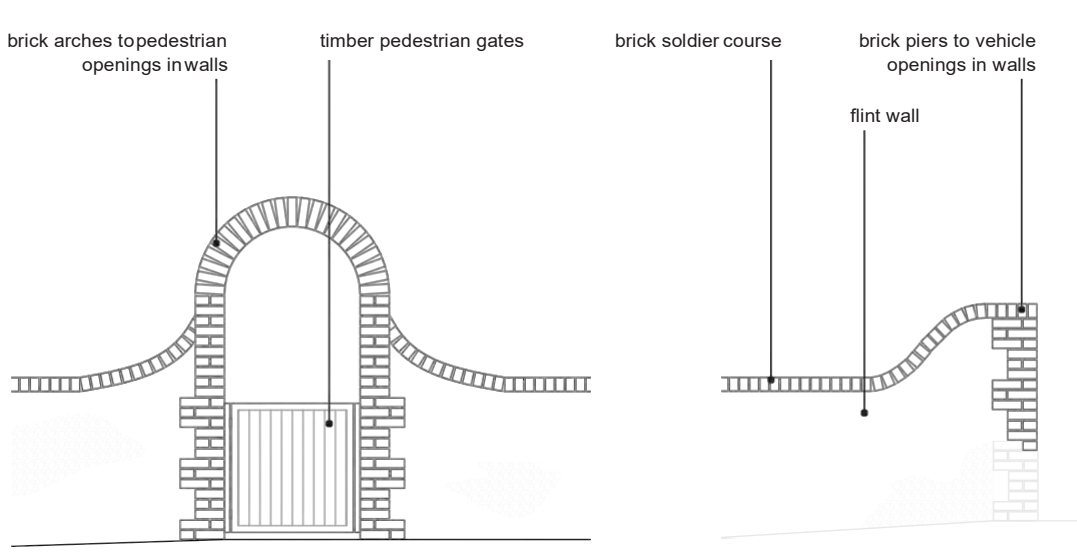
YEAR 2, YEAR 3, YEAR 4 - Replace any dead plants with the same species and specification, where space allows following development of the surrounding shrubs. Maintain mulch levels as above.

YEAR 5
 Remove protective guards from shrub planting. It is anticipated that the planting will be suitably established and that future management will be restricted to routine maintenance. Replace any dead plants with the same species and specification if space allows following development of surrounding shrubs.

YEAR 5 to 10
 Consideration for the bird nesting season dictates that any trimming work will need to be restricted to the months of September to February. Continued observations regarding the establishment and development of the landscape planting and reviewing management options accordingly will be necessary to benefit the planting scheme.

Parking and Bicycle Storage
 Plots 1-8 have garages, bicycles will also be stored in garages. Plots 9 & 10 have dedicated cycle storage – see schedule drawing P303_GA_0.09 for outbuilding specifications and locations marked on plan above.

refuSe
 All plots have timber bin stores with living green roofs - see schedule drawing P303_GA_0.09 or specifications and locations marked on plan above.



ProPoSed neW flint and Brick garden Walls



FLINT AND BRICK GARDEN WALLS



TIMBER POST AND RAIL FENCING



PERMEABLE PAVING: GOLDEN FOSSIL SANDSTONE



VERTICAL TIMBER CLOSE BOARDED FENCING



PERENNIAL PLANTING

ISSUE REGISTER		<p>1000000 10 Southbank Bridge Road London SE1 1UG 020 7592 4000 The Forge Garden, Rickling, SP 1 4LJ T: +44 (0)207 245 0727 W: info@tasarchitects.com</p>	PROJECT ADDRESS: GARDEN HOUSE LANE, RICKINGHALL	
DATE	ISSUE DESCRIPTION		CLIENT: NAP ANGLIA LTD	DRAWING TITLE: PROPOSED LANDSCAPING PLAN
			PURPOSE: PLANNING DRAFT	
			DRAWING NO.: P303_LA_0.01	-
			ISSUE NO.:	
THIS DRAWING IS FOR PLANNING PURPOSES ONLY		SCALE: 1:100 @ A1		

Surface Water Drainage Statement






Residential Development – Land south of Gardenhouse Lane, Rickingham, Suffolk

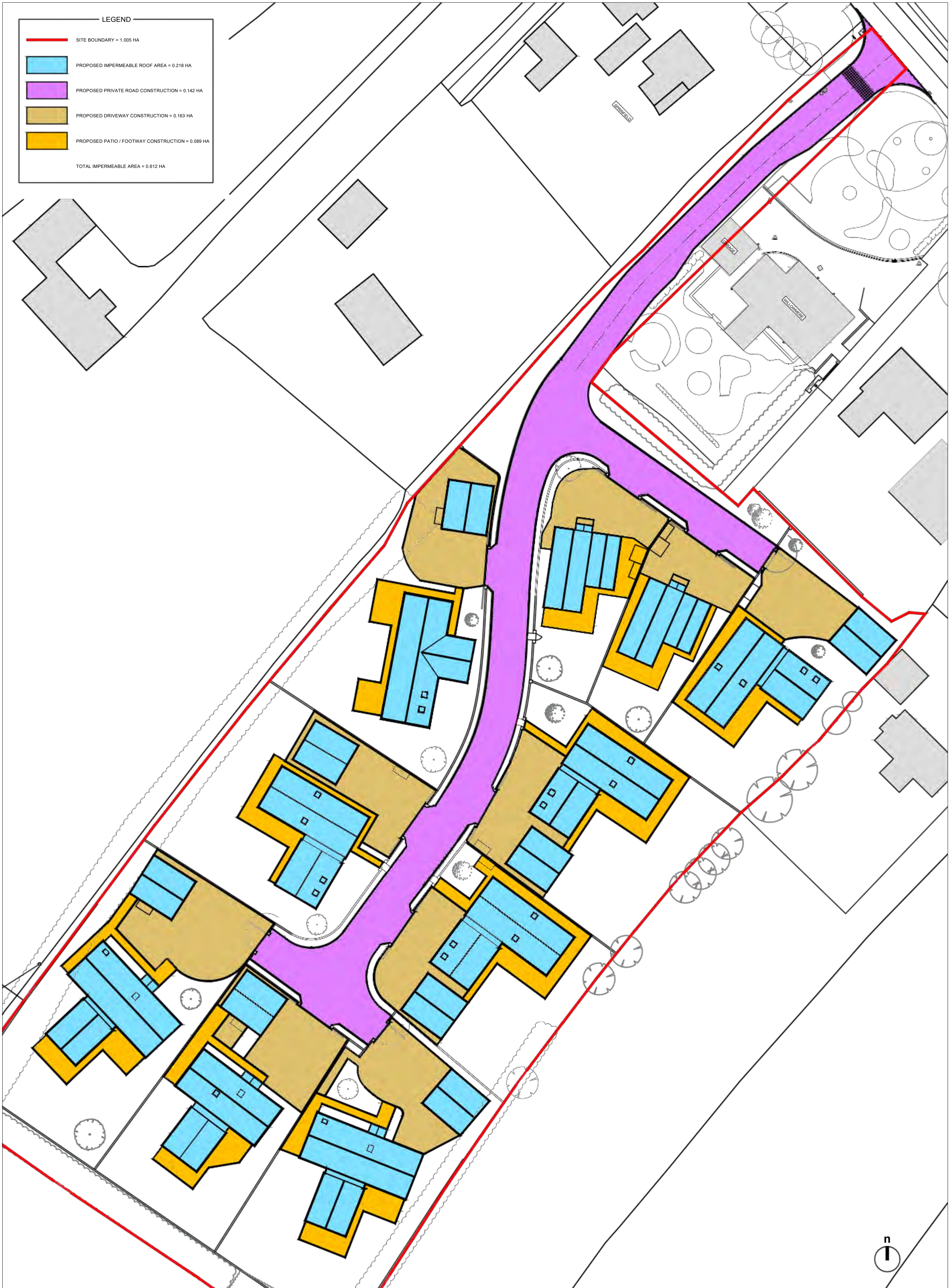


Appendix D

Proposed Impermeable Area Plan

LEGEND

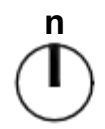
	SITE BOUNDARY = 1.005 HA
	PROPOSED IMPERMEABLE ROOF AREA = 0.218 HA
	PROPOSED PRIVATE ROAD CONSTRUCTION = 0.142 HA
	PROPOSED DRIVEWAY CONSTRUCTION = 0.163 HA
	PROPOSED PATIO / FOOTWAY CONSTRUCTION = 0.089 HA
TOTAL IMPERMEABLE AREA = 0.612 HA	



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Rev.	Date	Description
P1	25/02/22	First Issue

Drawn	Chk'd
RSM	RSM



client: NAP ANGLIA LTD		project: LAND SOUTH OF GARDEN HOUSE LANE, RICKINGHALL, SUFFOLK	
dwg title: PROPOSED IMPERMEABLE AREA PLAN			
discipline: CIVIL ENGINEERING	drawn: RSM	chk'd: RSM	date: FEB 2022
project no: BLI.2020.62	dwg no: PL 104	rev: P1	status: COMMENT & APPROVAL
scale @ A1 / A3: 1:250 / 1:500		scale @ A1 / A3: 1:500	

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Appendix E

Surface Water Calculations – Existing Greenfield Discharge Rates & Volumes

Contents

Page 1	Greenfield Discharge Rates
Pages 2 – 4	Greenfield Discharge Volumes

Norwich
Norfolk
.Residential Development
Land south of Gardenhouse Lane
Rickinghall, SuffolkDate 27/02/2022
FileDesigned by RSM
Checked by RSM

Causeway

Source Control 2020.1.3

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	SAAR (mm)	600	Urban	0.181
Area (ha)	1.005	Soil	0.400	Region Number	Region 5

Results 1/s

QBAR Rural 2.9

QBAR Urban 4.0

Q1 year 3.4

Q1 year 3.4

Q30 years 8.8

Q100 years 12.0

Norwich
Norfolk
.Residential Development
Land south of Gardenhouse Lane
Rickingham, SuffolkDate 27/02/2022
FileDesigned by RSM
Checked by RSM

Causeway

Source Control 2020.1.3

Greenfield Runoff Volume

FSR Data

Return Period (years)	1
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	20.000
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	1.005
SAAR (mm)	600
CWI	87.000
Urban	0.181
SPR	37.000

Results

Percentage Runoff (%)	29.81
Greenfield Runoff Volume (m ³)	65.535

Norwich
Norfolk
.

Residential Development
Land south of Gardenhouse Lane
Rickinghall, Suffolk



Date 27/02/2022
File

Designed by RSM
Checked by RSM

Causeway

Source Control 2020.1.3

Greenfield Runoff Volume

FSR Data

Return Period (years)	30
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	20.000
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	1.005
SAAR (mm)	600
CWI	87.000
Urban	0.181
SPR	37.000

Results

Percentage Runoff (%)	31.66
Greenfield Runoff Volume (m ³)	153.408

Norwich
Norfolk
.

Residential Development
Land south of Gardenhouse Lane
Rickinghall, Suffolk



Date 27/02/2022
File

Designed by RSM
Checked by RSM

Causeway

Source Control 2020.1.3

Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	20.000
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	1.005
SAAR (mm)	600
CWI	87.000
Urban	0.181
SPR	37.000

Results

Percentage Runoff (%)	33.57
Greenfield Runoff Volume (m ³)	210.892

Surface Water Drainage Statement

Residential Development – Land south of Gardenhouse Lane, Rickingham, Suffolk



Appendix F

BRE 365 Percolation Testing (Planning Application)

APPENDIX A – INFILTRATION TESTING RESULTS

Infiltration Test to BRE365 -TP1 Test 1

Field Data

Time	Time Elapsed (min)	Time Elapsed (sec)	Depth of Water below GL (m)
	0	0	1.20
	1.0	60	1.45
	2.0	120	1.70
	15	900	1.95
	28	1680	2.00
	107	6420	2.20

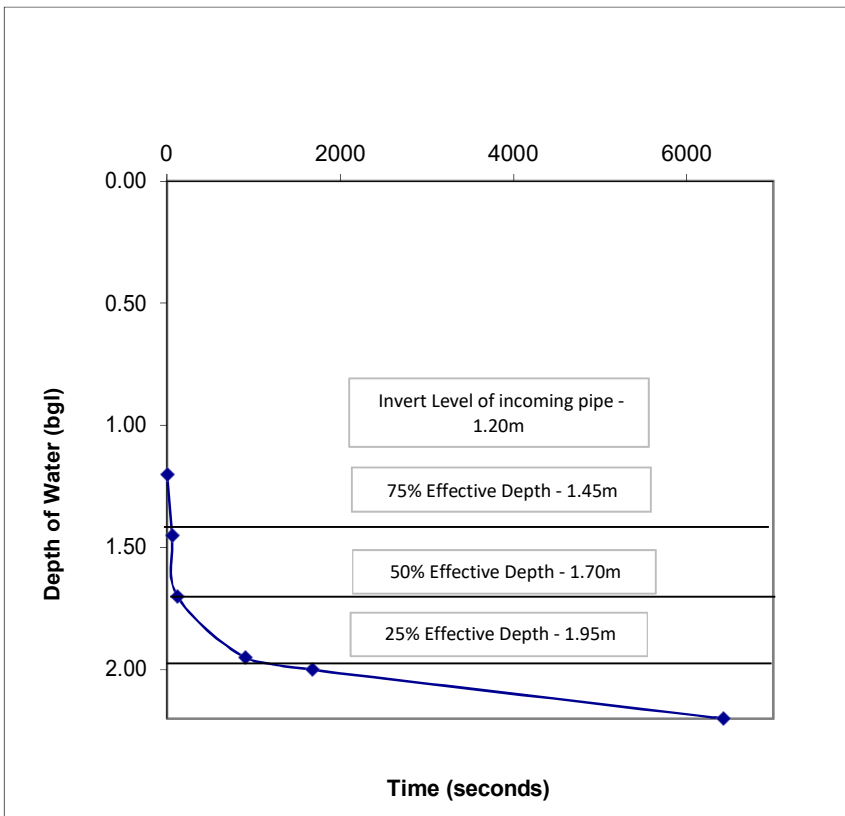
Location: TP1
Weather: Unknown
Engineer: Client
Date: 27/03/17

TEST 1

Strata Tested Unknown

1.00m	TP1 - 2.20m depth Assume invert level of incoming drain is 1.20m bgl. Effective depth = 1.00m	Pit Depths (m bgl) Length 1 Width 0.45 Depth 2.2 25% Effective Depth 0.75 75% Effective Depth 0.25 Inlet Depth 1.2
		0.45m

Linear extrapolated values for calculation
 Calculation parameters values



CALCULATION:

Soil Infiltration Rate(f) =
 $V_{p75-25} / (ap_{50} \times t_{p75-25})$

Where:

V_{p75-25} = effective storage volume between 75% and 25% effective depth
 $1.00 \times 0.45 \times ((0.75+0.00)-(0.25+0.00))$
 = **0.225**

ap_{50} = internal area of TP upto 50% effective depth + base of TP
 $2(1.00 \times 0.50) + 2(0.45 \times 0.50) + (1.00 \times 0.45)$
 = **1.9**

t_{p75-25} = the time for water level to fall from 75% - 25% effective depth
 = **840** secs

f = **1.41E-04** m/s

Comment

Test carried out by Client in 2.20m total depth pit filled to 1.20m depth.



Client: Evans Rivers and Coastal Limited
Project No: P17-060
Project: Willowmere, Garden House Lane, Rickinghall

Infiltration Test to BRE365 -TP2 Test 1

Field Data

Location: TP2
Weather: Unknown
Engineer: Client
Date: 28/03/17

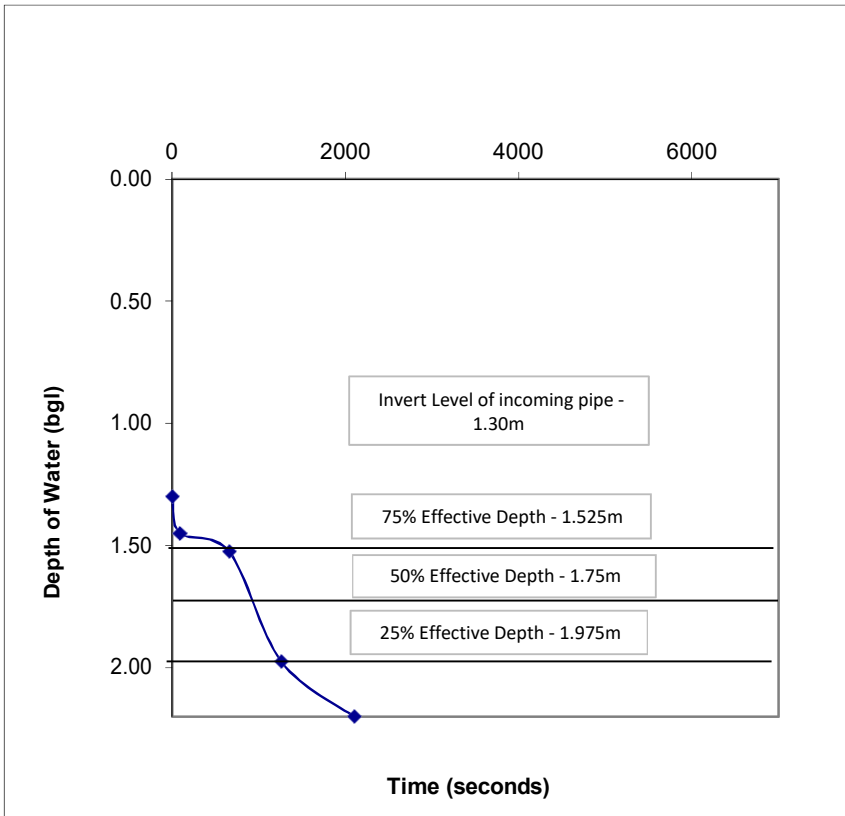
TEST 1

Time	Time Elapsed (min)	Time Elapsed (sec)	Depth of Water below GL (m)
	0	0	1.30
	1.5	90	1.45
	11	660	1.53
	21	1260	1.98
	35	2100	2.20

Strata Tested Unknown

1.00m	TP2 - 2.20m depth Assume invert level of incoming drain in 1.30m bgl. Effective depth = 0.90m	Pit Depths (m bgl) Length 1 Width 0.45 Depth 2.2 25% Effective Depth 0.675 75% Effective Depth 0.225 Inlet Depth 1.3
	0.45m	

Linear extrapolated values for calculation
 Calculation parameters values



CALCULATION:

Soil Infiltration Rate(f) =
 $V_{p75-25} / (ap_{50} \times t_{p75-25})$

Where:

V_{p75-25} = effective storage volume between 75% and 25% effective depth
 $1.00 \times 0.45 \times ((0.675+0.00)-(0.225+0.00))$
 = **0.2025**

ap_{50} = internal area of TP upto 50% effective depth + base of TP
 $2(1.00 \times 0.45) + 2(0.45 \times 0.45) + (1.00 \times 0.45)$
 = **1.755**

t_{p75-25} = the time for water level to fall from 75% - 25% effective depth
 = **600** secs

f = **1.92E-04** m/s

Comment

Test carried out by Client in 2.20m total depth pit filled to 1.30m depth.



Client: Evans Rivers and Coastal Limited
Project No: P17-060
Project: Willowmere, Garden House Lane, Rickinghall

Surface Water Drainage Statement

Residential Development – Land south of Gardenhouse Lane, Rickingham, Suffolk



Appendix G

BRE 365 Percolation Testing (Additional Investigation)

Proposed Residential Development

Land south of Garden House Lane, Rickingham, Suffolk

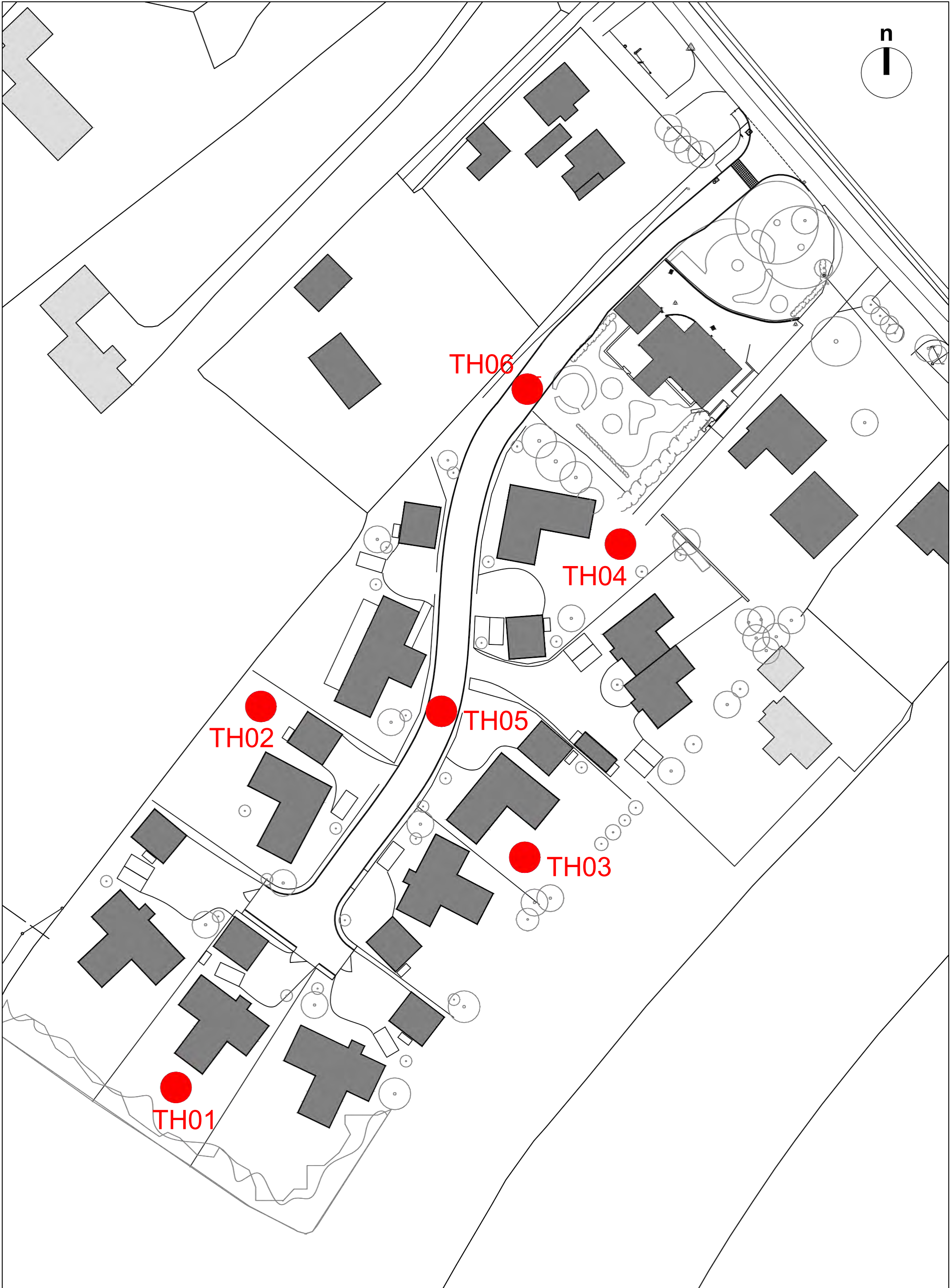
BRE 365 Percolation Tests

Job No. BLI.2020.62

Revision 0

Contents

Page 1	Percolation Test Location Plan
Pages 2 - 3	Test Hole (TH) 01 – BRE 365 Percolation Test
Pages 4 – 5	Test Hole (TH) 02 – BRE 365 Percolation Test
Pages 6 – 9	Test Hole (TH) 03 – BRE 365 Percolation Test
Pages 10 – 13	Test Hole (TH) 04 – BRE 365 Percolation Test
Pages 14 – 17	Test Hole (TH) 05 – BRE 365 Percolation Test
Pages 18 – 21	Test Hole (TH) 06 – BRE 365 Percolation Test



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P2	01/12/21	Amended to suit on-site testing	RSM	RSM
P1	10/08/21	First Issue	RSM	RSM
Rev.	Date	Description	Drawn	Chk'd

RSM	RSM
RSM	RSM
Drawn	Chk'd



client:	NAP ANGLIA LTD						
project:	LAND SOUTH OF GARDEN HOUSE LANE, RICKINGHALL, SUFFOLK						
discipline:	CIVIL ENGINEERING						
project no.:	BLI.2020.62	dwg no.:	SK 01	rev.:	P2		
drawn:	RSM	chk'd:	RSM	date:	AUG 2021	scale:	A3 N.T.S
status:	INFORMATION						

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Job No:
BLI.2020.62

Date:
Sep-21

Client:
NAP Anglia Ltd

Prepared By:
RSM

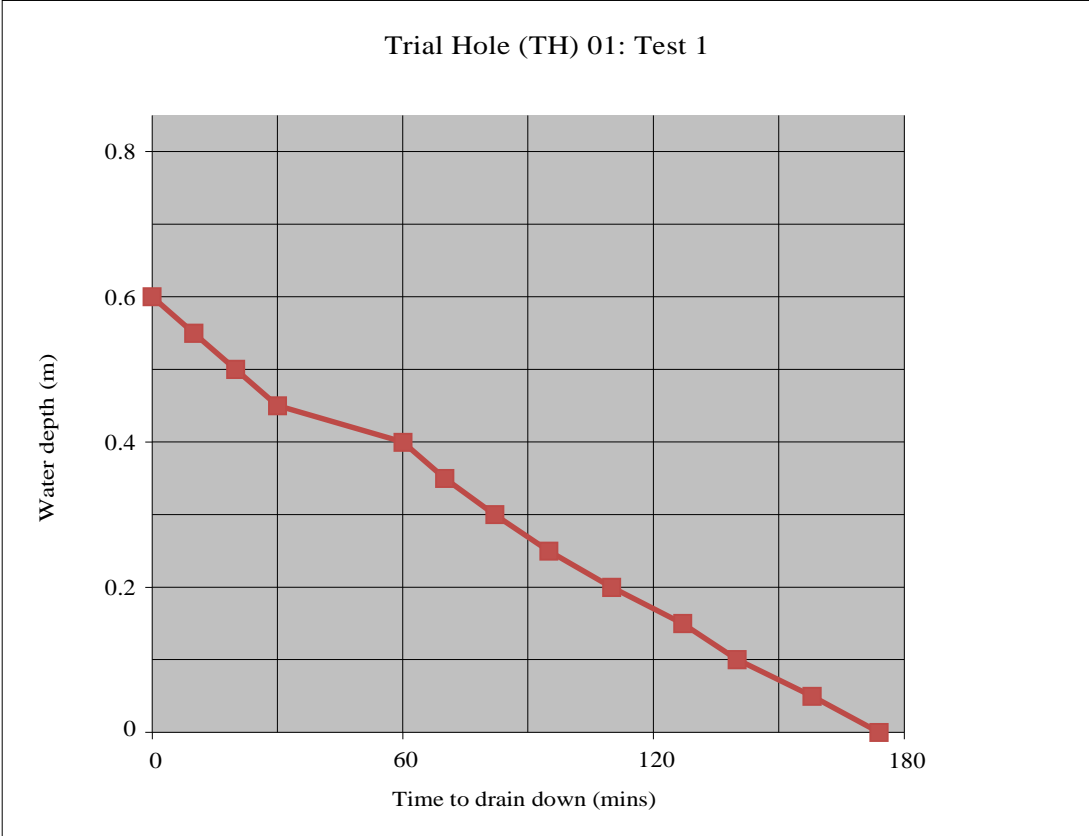
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RSM

Project:
Residential Development

Sheet No:
3

Revision
0

Land south of Garden House Lane
Rickingham, Suffolk



V (75-25)	0.135 cu m
T (75-25)	1.617 hrs
Wetted Area (50%)	1.530 sq m
Infiltration rate m/hr	0.054578532 m/hr
Infiltration rate m	1.516E-05 m/s

Job No:
BLI.2020.62

Date:
Sep-21

Client:
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Prepared By:
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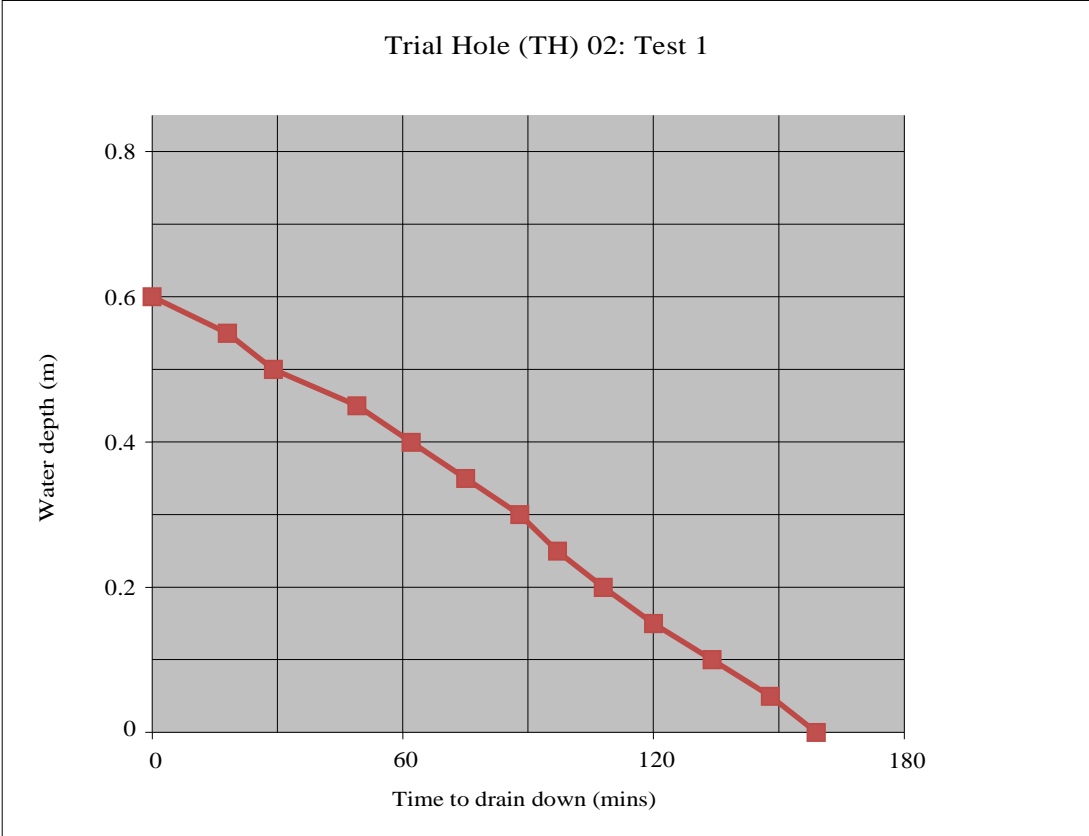
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Project:
Residential Development

Sheet No:
5

Revision
0

Land south of Garden House Lane
Rickingham, Suffolk



V (75-25)	0.135 cu m
T (75-25)	1.183 hrs
Wetted Area (50%)	1.530 sq m
Infiltration rate m/hr	0.074565037 m/hr
Infiltration rate m	2.071E-05 m/s

Job No:
BLI.2020.62

Date:
Sep-21

Client:
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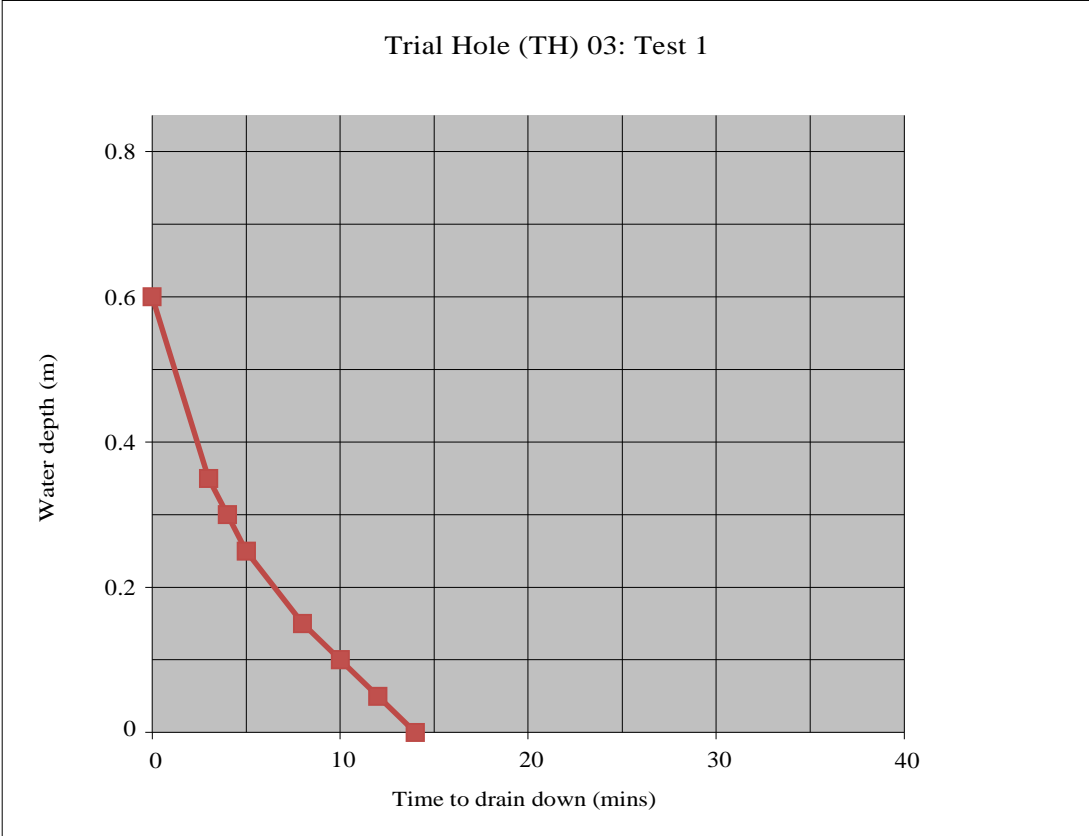
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Sheet No:
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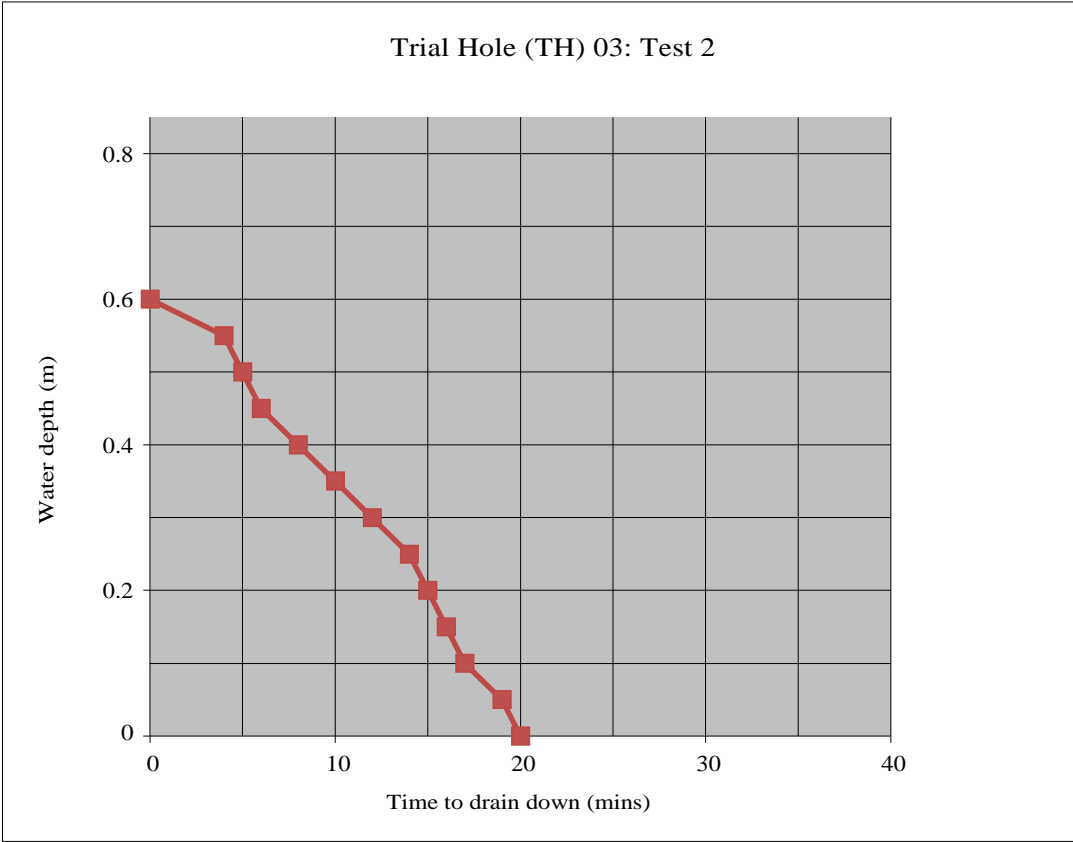
Revision
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Land south of Garden House Lane
Rickingham, Suffolk



V (75-25)	0.135 cu m
T (75-25)	0.103 hrs
Wetted Area (50%)	1.530 sq m
Infiltration rate m/hr	0.853889943 m/hr
Infiltration rate m	2.372E-04 m/s

Job No: BLI.2020.62	Date: Sep-21	Client: NAP Anglia Ltd
Prepared By: RSM	Checked By: RSM	Project: Residential Development
Sheet No: 8	Revision 0	Land south of Garden House Lane Rickingham, Suffolk



V (75-25)	0.135 cu m
T (75-25)	0.167 hrs
Wetted Area (50%)	1.530 sq m
Infiltration rate m/hr	0.529411765 m/hr
Infiltration rate m	1.471E-04 m/s

Job No:
BLI.2020.62

Date:
Sep-21

Client:
NAP Anglia Ltd

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RSM

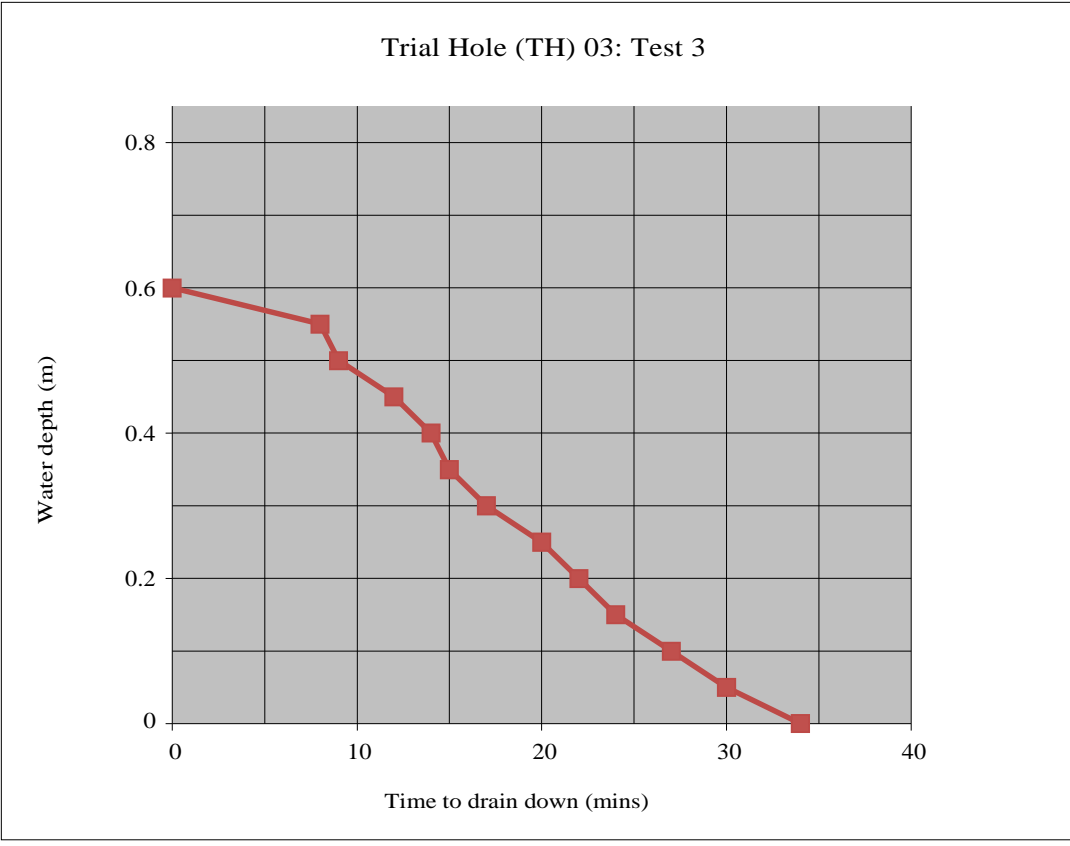
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RSM

Project:
Residential Development

Sheet No:
9

Revision
0

Land south of Garden House Lane
Rickingham, Suffolk



V (75-25)	0.135 cu m
T (75-25)	0.200 hrs
Wetted Area (50%)	1.530 sq m
Infiltration rate m/hr	0.441176471 m/hr
Infiltration rate m	1.225E-04 m/s

Job No:
BLI.2020.62

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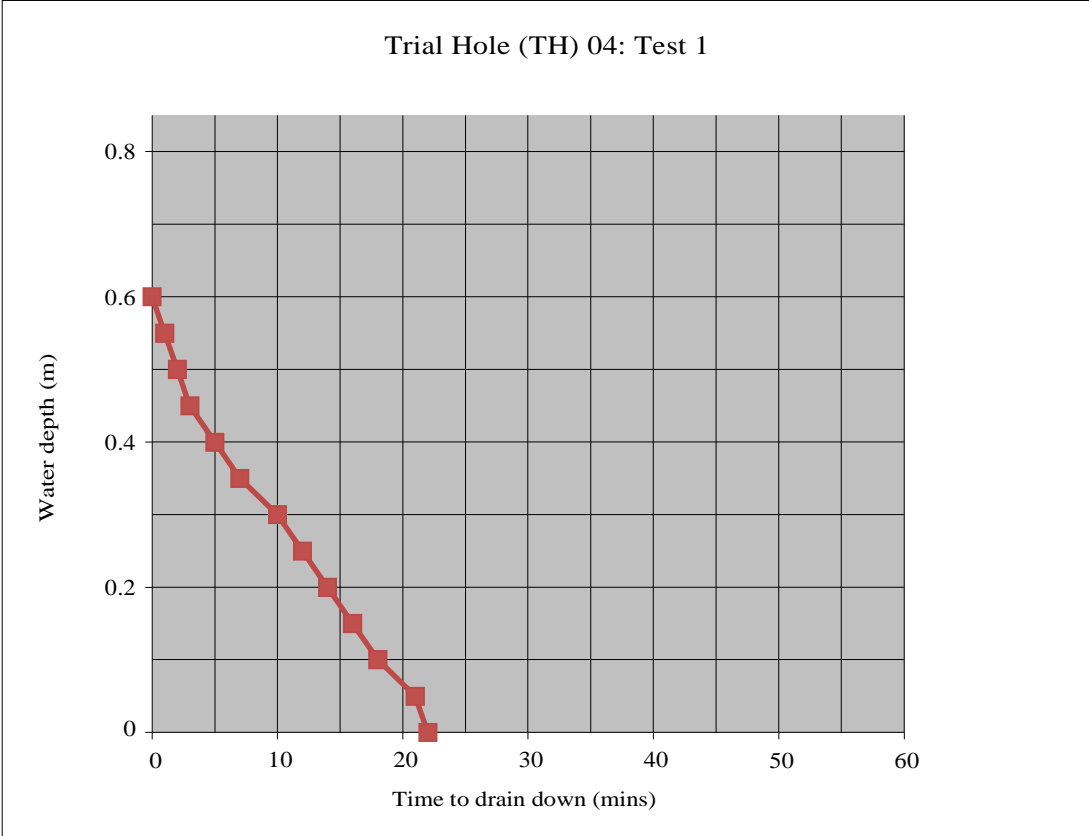
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Residential Development

Sheet No:
11

Revision
0

Land south of Garden House Lane
Rickingham, Suffolk



V (75-25)	0.135 cu m
T (75-25)	0.217 hrs
Wetted Area (50%)	1.530 sq m
Infiltration rate m/hr	0.407239819 m/hr
Infiltration rate m	1.131E-04 m/s

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BLI.2020.62

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Client:
NAP Anglia Ltd

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Residential Development

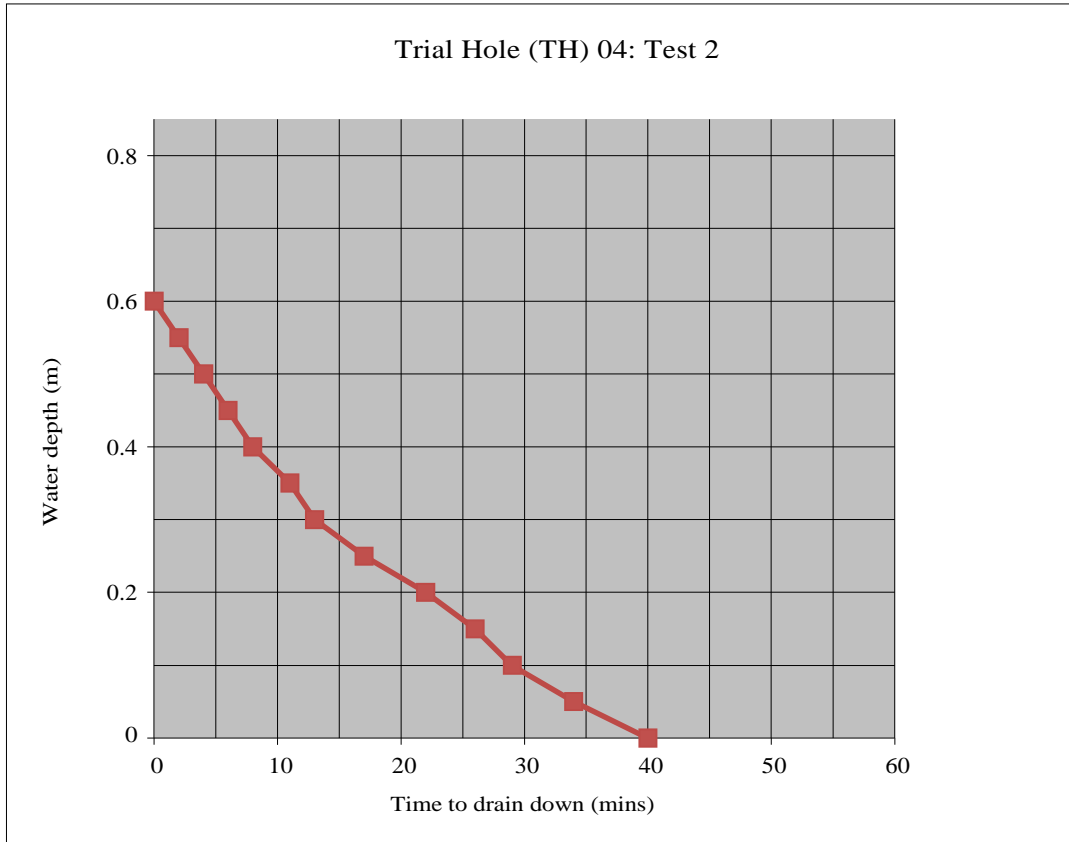
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12

Revision
0

Land south of Garden House Lane
Rickingham, Suffolk



Trial Hole (TH) 04: Test 2



V (75-25)	0.135 cu m
T (75-25)	0.333 hrs
Wetted Area (50%)	1.530 sq m
Infiltration rate m/hr	0.264705882 m/hr
Infiltration rate m	7.353E-05 m/s

Job No:
BLI.2020.62

Date:
Sep-21

Client:
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Residential Development

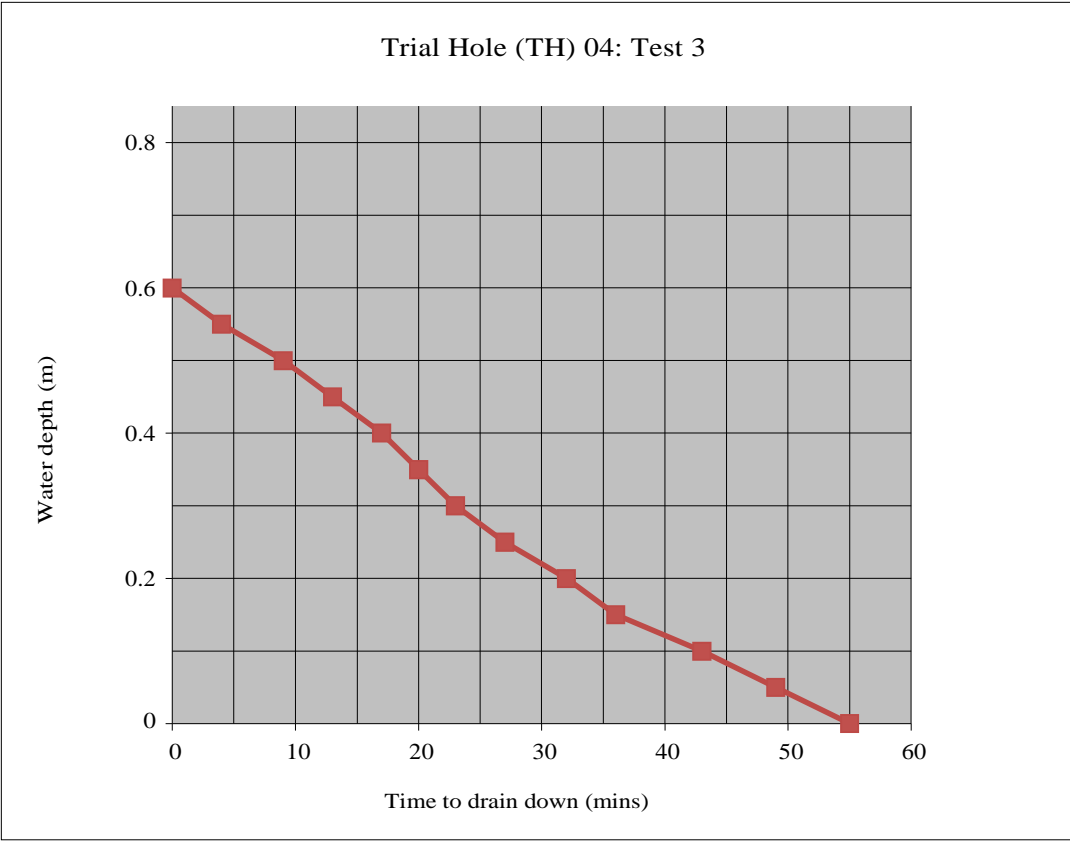
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13

Revision
0

Land south of Garden House Lane
Rickingham, Suffolk



Trial Hole (TH) 04: Test 3



V (75-25)	0.135 cu m
T (75-25)	0.383 hrs
Wetted Area (50%)	1.530 sq m
Infiltration rate m/hr	0.230179028 m/hr
Infiltration rate m	6.394E-05 m/s

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BLI.2020.62

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Client:
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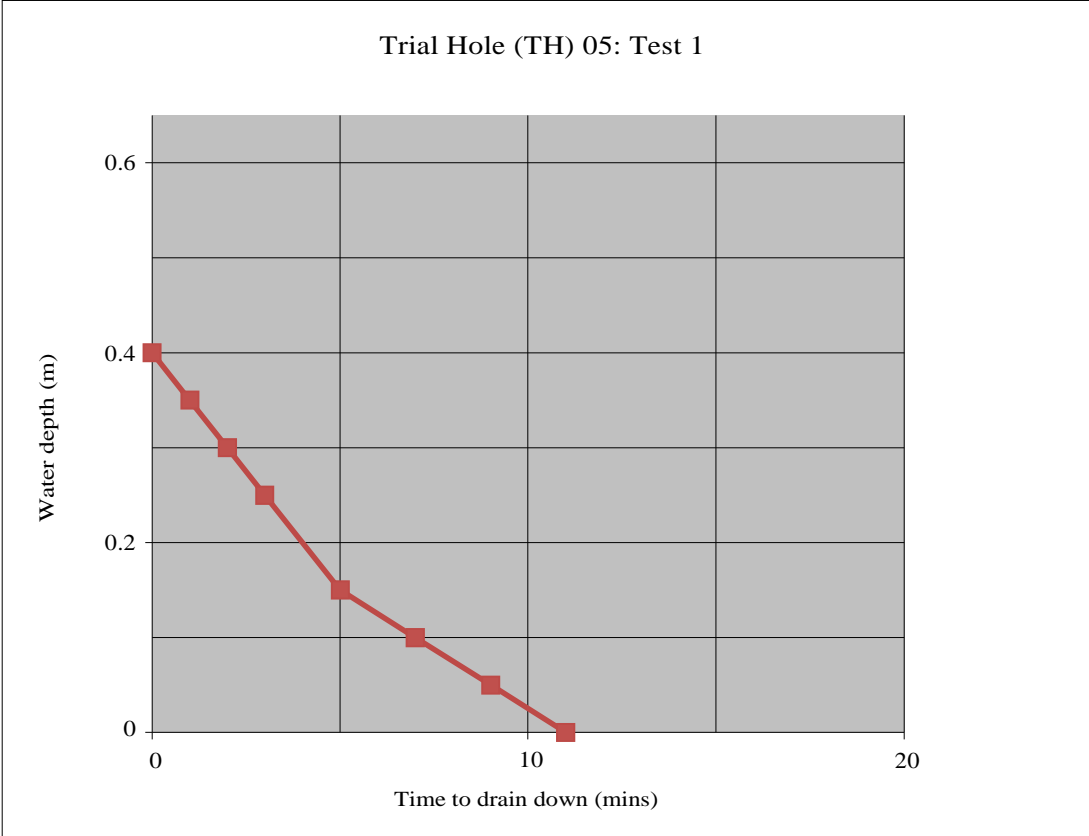
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Project:
Residential Development

Sheet No:
15

Revision
0

Land south of Garden House Lane
Rickingham, Suffolk



V (75-25)	0.090 cu m
T (75-25)	0.083 hrs
Wetted Area (50%)	1.170 sq m
Infiltration rate m/hr	0.923076923 m/hr
Infiltration rate m	2.564E-04 m/s

Job No:
BLI.2020.62

Date:
Sep-21

Client:
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RSM

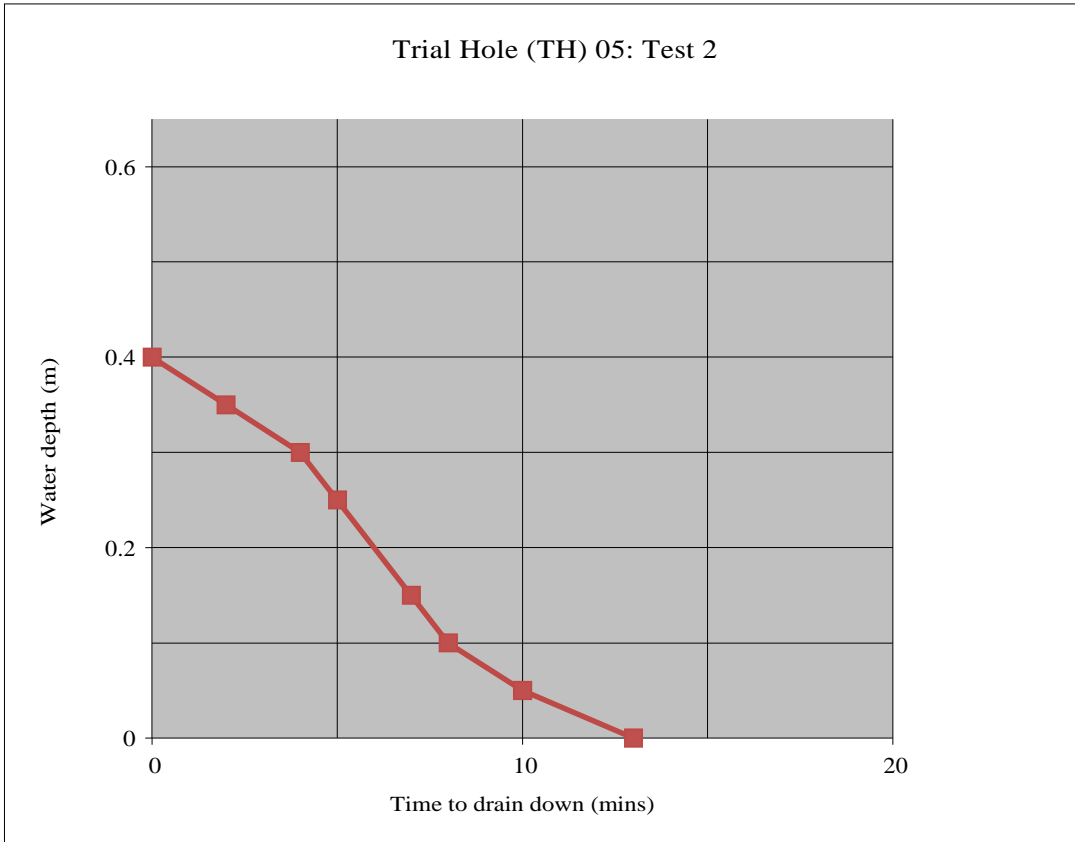
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Residential Development


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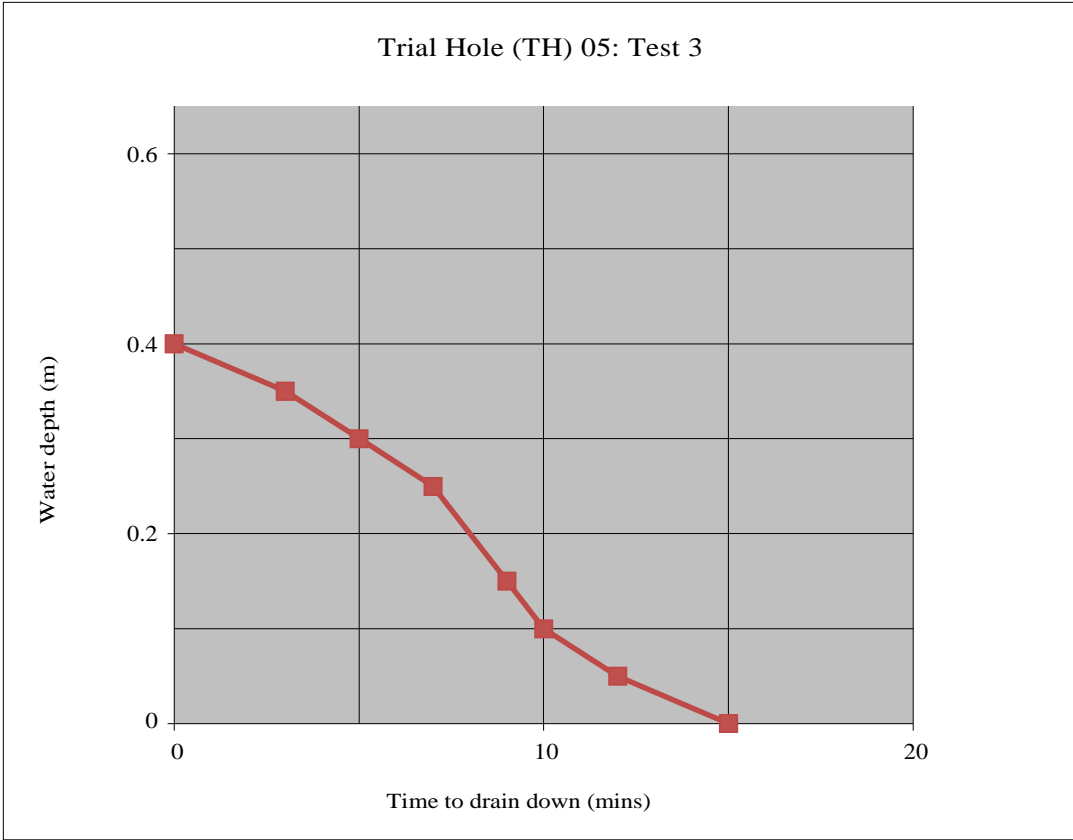
Revision
0

Land south of Garden House Lane
Rickingham, Suffolk



V (75-25)	0.090 cu m
T (75-25)	0.067 hrs
Wetted Area (50%)	1.170 sq m
Infiltration rate m/hr	1.153846154 m/hr
Infiltration rate m	3.205E-04 m/s

Job No: BLI.2020.62	Date: Sep-21	Client: NAP Anglia Ltd	
Prepared By: RSM	Checked By: RSM	Project: Residential Development	
Sheet No: 17	Revision 0	Land south of Garden House Lane Rickingham, Suffolk	



V (75-25)	0.090 cu m
T (75-25)	0.083 hrs
Wetted Area (50%)	1.170 sq m
Infiltration rate m/hr	0.923076923 m/hr
Infiltration rate m	2.564E-04 m/s

Job No:
BLI.2020.62

Date:
Sep-21

Client:
NAP Anglia Ltd

Prepared By:
RSM

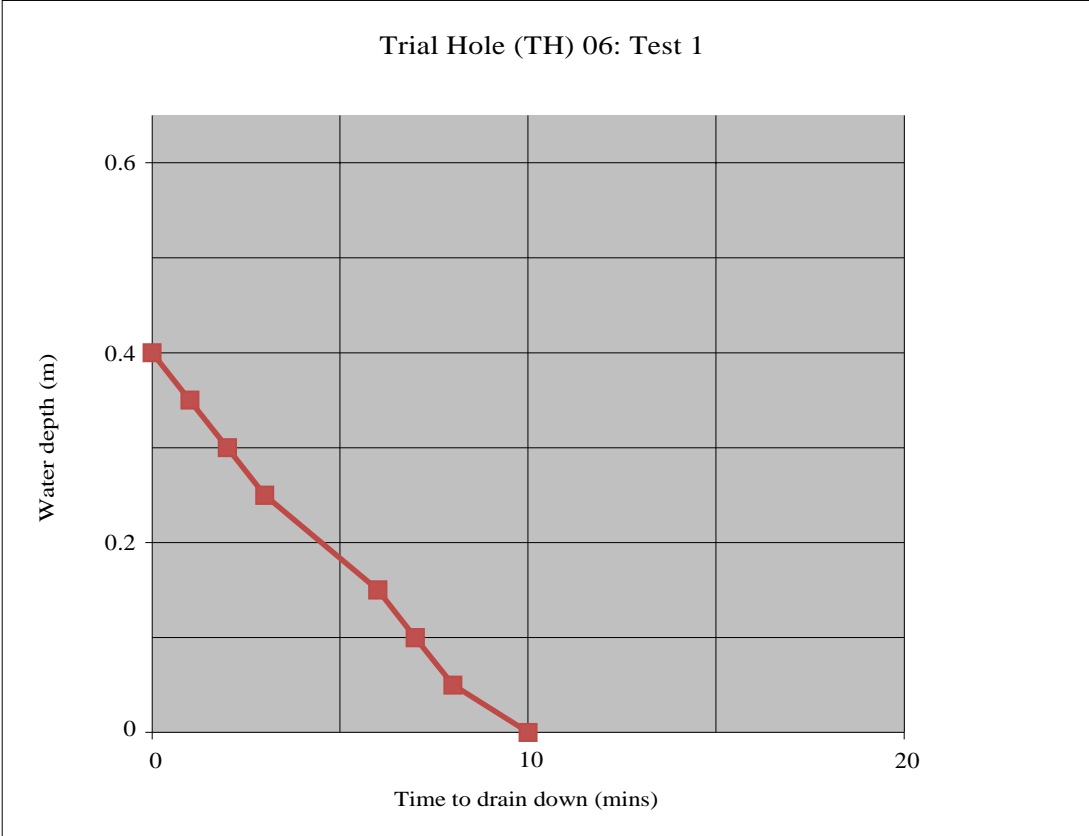
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Project:
Residential Development

Sheet No:
19

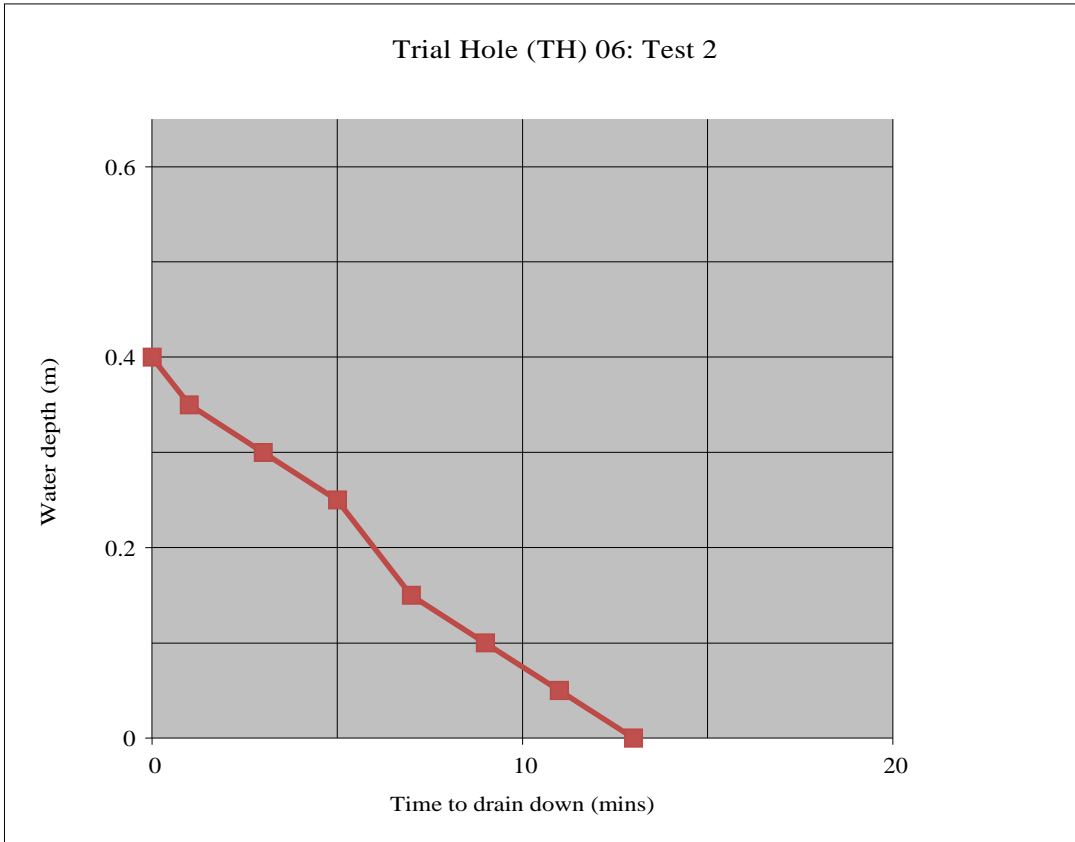
Revision
0

Land south of Garden House Lane
Rickingham, Suffolk



V (75-25)	0.090 cu m
T (75-25)	0.083 hrs
Wetted Area (50%)	1.170 sq m
Infiltration rate m/hr	0.923076923 m/hr
Infiltration rate m	2.564E-04 m/s

Job No: BLI.2020.62	Date: Sep-21	Client: NAP Anglia Ltd
Prepared By: RSM	Checked By: RSM	Project: Residential Development
Sheet No: 20	Revision 0	Land south of Garden House Lane Rickingham, Suffolk



V (75-25)	0.090 cu m
T (75-25)	0.100 hrs
Wetted Area (50%)	1.170 sq m
Infiltration rate m/hr	0.769230769 m/hr
Infiltration rate m	2.137E-04 m/s

Job No:
BLI.2020.62

Date:
Sep-21

Client:
NAP Anglia Ltd

Prepared By:
RSM

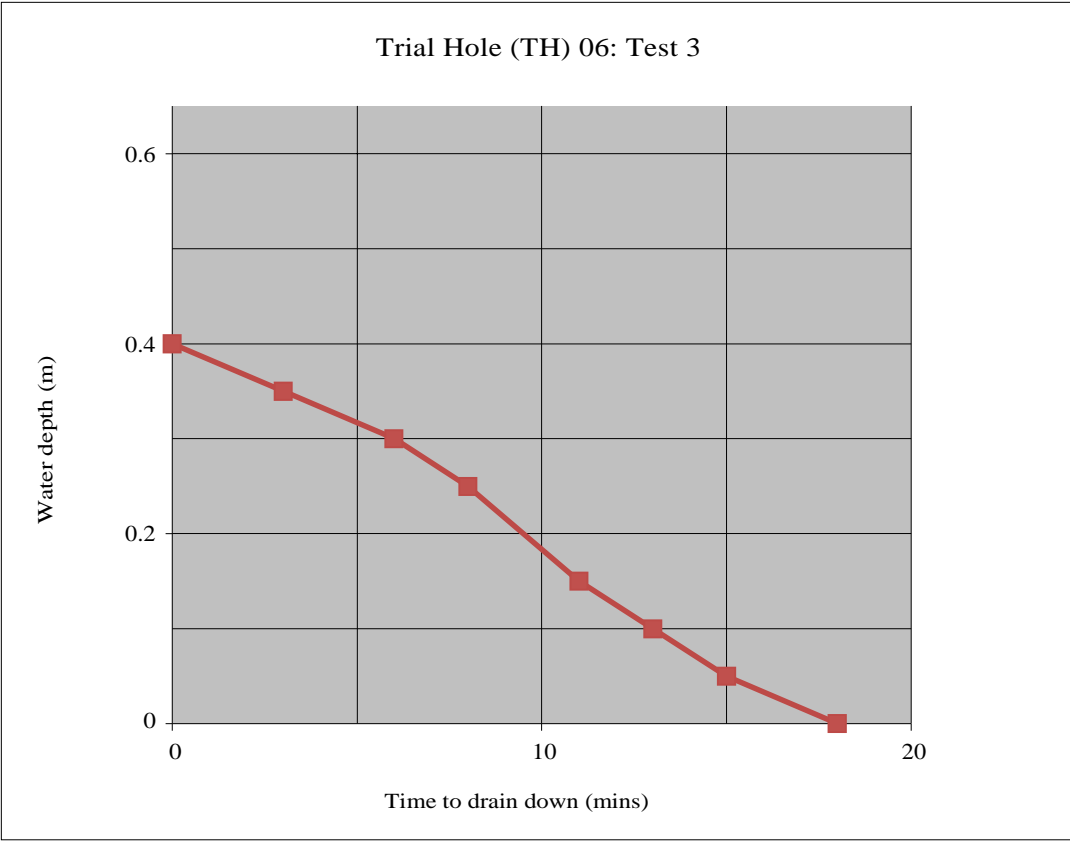
Checked By:
RSM

Project:
Residential Development

Sheet No:
21

Revision
0

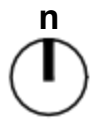
Land south of Garden House Lane
Rickingham, Suffolk



V (75-25)	0.090 cu m
T (75-25)	0.117 hrs
Wetted Area (50%)	1.170 sq m
Infiltration rate m/hr	0.659340659 m/hr
Infiltration rate m	1.832E-04 m/s

Appendix H

Proposed Surface Drainage Layout/Strategy



PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 2) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.024 HA (PLOT 2 GREEN HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 10.0m LONG x 0.8m DEEP
- BASE OF CRATE = 40.55
- TOP OF CRATE = 41.35
- GROUND LEVEL = 42.15

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 1B) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.008 HA (PLOT 1B PURPLE HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 4.5m LONG x 0.4m DEEP
- BASE OF CRATE = 42.00
- TOP OF CRATE = 42.40
- GROUND LEVEL = 43.20

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 8A) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.019 HA (PLOT 8A PINK HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 8.0m LONG x 0.8m DEEP
- BASE OF CRATE = 39.00
- TOP OF CRATE = 39.80
- GROUND LEVEL = 40.80

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 3A) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.020 HA (PLOT 3A ORANGE HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 8.5m LONG x 0.8m DEEP
- BASE OF CRATE = 41.85
- TOP OF CRATE = 42.65
- GROUND LEVEL = 43.40

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 7) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.024 HA (PLOT 7 BLUE HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.5m WIDE x 8.0m LONG x 0.8m DEEP
- BASE OF CRATE = 40.15
- TOP OF CRATE = 40.95
- GROUND LEVEL = 41.75

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 6) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.024 HA (PLOT 6 ORANGE HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.5m WIDE x 8.0m LONG x 0.8m DEEP
- BASE OF CRATE = 40.80
- TOP OF CRATE = 41.40
- GROUND LEVEL = 42.20

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 5B) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.008 HA (PLOT 5B PURPLE HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 4.5m LONG x 0.4m DEEP
- BASE OF CRATE = 42.00
- TOP OF CRATE = 42.40
- GROUND LEVEL = 43.20

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 4A) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.018 HA (PLOT 4A PINK HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 7.5m LONG x 0.8m DEEP
- BASE OF CRATE = 41.85
- TOP OF CRATE = 42.65
- GROUND LEVEL = 43.40

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 4B) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.008 HA (PLOT 4B BLUE HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 4.5m LONG x 0.4m DEEP
- BASE OF CRATE = 42.10
- TOP OF CRATE = 42.50
- GROUND LEVEL = 43.30

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 5A) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (+40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.020 HA (PLOT 5A GREEN HATCH)
- ATTENUATION STRUCTURE = WAVIN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = 1.5×10^{-5} m/s
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 8.5m LONG x 0.8m DEEP
- BASE OF CRATE = 41.85
- TOP OF CRATE = 42.65
- GROUND LEVEL = 43.40

LEGEND

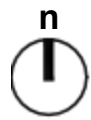
- SITE BOUNDARY
- PROPOSED PRIVATE SURFACE WATER DRAINAGE NETWORK
- PROPOSED PRIVATE SURFACE WATER INSPECTION CHAMBER
- EXCEEDANCE / CONSTRUCTION PHASE ROAD GULLY WITH DISTRIBUTION TANK DISCHARGING INTO GRANULAR SUB-BASE CONSTRUCTION
- EXCEEDANCE / CONSTRUCTION PHASE DRIVEWAY GULLY WITH DISTRIBUTION TANK DISCHARGING INTO GRANULAR SUB-BASE CONSTRUCTION
- 5.0m OFFSET FROM EXISTING & PROPOSED BUILDING STRUCTURE
- PERMEABLE ASPHALT CONSTRUCTION (PRIVATE ACCESS ROAD)
- PERMEABLE ASPHALT CONSTRUCTION (PRIVATE DRIVEWAY)
- PERMEABLE FLAG CONSTRUCTION (PRIVATE PATIO)
- PROPOSED GEO-CELLULAR SOAKAWAY CONSTRUCTION (COLOUR TO SUIT DRAINAGE CATCHMENT)
- CONCRETE ISOLATION DAM TO ENABLE PERMEABLE PAVING CONSTRUCTION TO DRAIN INDEPENDENTLY FROM THE ADJACENT AREA

Rev.	Date	Description	Drawn	Chk'd
P2	25/02/22	SITE LAYOUT AMENDED AND DETAILED DESIGN UNDERTAKEN	RSM	RSM
P1	13/12/21	FIRST ISSUE	RSM	RSM



client: NAP ANGLIA LTD
 project: LAND SOUTH OF GARDEN HOUSE LANE, RICKINGHALL, SUFFOLK
 dwg title: SURFACE WATER DRAINAGE LAYOUT / STRATEGY (SHEET 1 OF 2)
 discipline: CIVIL ENGINEERING
 project no: BLI.2020.62
 dwg no: PL 101
 rev: P2
 status: COMMENT & APPROVAL
 date: RSM RSM DEC 2021
 scale: @ A1 / A3
 1:250 / 1:500

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PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 1B) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (-40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.008 HA (PLOT 1B ORANGE HATCH)
- ATTENUATION STRUCTURE = WAVN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = $1.5 \times 10^{-5} \text{ m/s}$
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 4.5m LONG x 0.4m DEEP
- BASE OF CRATE = 39.80
- TOP OF CRATE = 40.00
- GROUND LEVEL = 40.80

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 1D) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (-40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.012 HA (PLOT 1D PURPLE HATCH)
- ATTENUATION STRUCTURE = WAVN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = $1.5 \times 10^{-5} \text{ m/s}$
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 5.0m LONG x 0.8m DEEP
- BASE OF CRATE = 39.80
- TOP OF CRATE = 40.00
- GROUND LEVEL = 40.50

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 1E) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (-40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.012 HA (PLOT 1E GREEN HATCH)
- ATTENUATION STRUCTURE = WAVN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = $1.5 \times 10^{-5} \text{ m/s}$
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 1.5m WIDE x 7.0m LONG x 0.8m DEEP
- BASE OF CRATE = 39.80
- TOP OF CRATE = 40.00
- GROUND LEVEL = 40.80

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 1A) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (-40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.019 HA (PLOT 1A PINK HATCH)
- ATTENUATION STRUCTURE = WAVN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = $1.5 \times 10^{-5} \text{ m/s}$
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 8.0m LONG x 0.8m DEEP
- BASE OF CRATE = 39.50
- TOP OF CRATE = 40.30
- GROUND LEVEL = 41.00

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 1C) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (-40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.008 HA (PLOT 1C ORANGE HATCH)
- ATTENUATION STRUCTURE = WAVN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = $1.5 \times 10^{-5} \text{ m/s}$
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 4.5m LONG x 0.4m DEEP
- BASE OF CRATE = 39.30
- TOP OF CRATE = 39.70
- GROUND LEVEL = 40.50

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 2) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (-40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.024 HA (PLOT 2 GREEN HATCH)
- ATTENUATION STRUCTURE = WAVN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = $1.5 \times 10^{-5} \text{ m/s}$
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 10.0m LONG x 0.8m DEEP
- BASE OF CRATE = 40.55
- TOP OF CRATE = 41.35
- GROUND LEVEL = 42.15

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 5B) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (-40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.008 HA (PLOT 5B PURPLE HATCH)
- ATTENUATION STRUCTURE = WAVN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = $1.5 \times 10^{-5} \text{ m/s}$
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 4.5m LONG x 0.4m DEEP
- BASE OF CRATE = 42.00
- TOP OF CRATE = 42.40
- GROUND LEVEL = 43.20

PROPOSED GEO-CELLULAR SOAKAWAY (PLOT 5A) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION AND GUIDANCE.

- DESIGN STANDARD = 100-YEAR (-40%) PLUS CLIMATE CHANGE STORM EVENT
- IMPERMEABLE AREA = 0.019 HA (PLOT 5A PINK HATCH)
- ATTENUATION STRUCTURE = WAVN OSMA AQUACELL CORE-R GEO-CELLULAR UNITS WRAPPED IN A PROTECTIVE GEO-TEXTILE LAYER.
- INFILTRATION RATE = $1.5 \times 10^{-5} \text{ m/s}$
- SAFETY FACTOR = 3.0
- ATTENUATION DIMENSIONS = 2.0m WIDE x 8.0m LONG x 0.8m DEEP
- BASE OF CRATE = 39.00
- TOP OF CRATE = 39.80
- GROUND LEVEL = 40.60

LEGEND

- SITE BOUNDARY
- PROPOSED PRIVATE SURFACE WATER DRAINAGE NETWORK
- PROPOSED PRIVATE SURFACE WATER INSPECTION CHAMBER
- EXCEEDANCE / CONSTRUCTION PHASE ROAD GULLY WITH DISTRIBUTION TANK DISCHARGING INTO GRANULAR SUB-BASE CONSTRUCTION
- EXCEEDANCE / CONSTRUCTION PHASE DRIVEWAY GULLY WITH DISTRIBUTION TANK DISCHARGING INTO GRANULAR SUB-BASE CONSTRUCTION
- 5.0m OFFSET FROM EXISTING & PROPOSED BUILDING STRUCTURE
- PERMEABLE ASPHALT CONSTRUCTION (PRIVATE ACCESS ROAD)
- PERMEABLE ASPHALT CONSTRUCTION (PRIVATE DRIVEWAY)
- PERMEABLE FLAG CONSTRUCTION (PRIVATE PATIO)
- PROPOSED GEO-CELLULAR SOAKAWAY CONSTRUCTION (COLOUR TO SUIT DRAINAGE CATCHMENT)
- CONCRETE ISOLATION DAM TO ENABLE PERMEABLE PAVING CONSTRUCTION TO DRAIN INDEPENDENTLY FROM THE ADJACENT AREA

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P2	25/02/22	SITE LAYOUT AMENDED AND DETAILED DESIGN UNDERTAKEN	RSM	RSM
P1	13/12/21	FIRST ISSUE	RSM	RSM
Rev.	Date	Description	Drawn	Chkd



client: NAP ANGLIA LTD
 project: LAND SOUTH OF GARDEN HOUSE LANE, RICKINGHALL, SUFFOLK
 dwg title: SURFACE WATER DRAINAGE LAYOUT / STRATEGY (SHEET 2 OF 2)
 discipline: CIVIL ENGINEERING
 project no: BLI.2020.62
 dwg no: PL 102
 rev: P2
 status: COMMENT & APPROVAL

drawn: RSM
 checked: RSM
 date: DEC 2021
 scale: @ A1 / A3
 1:250 / 1:500

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LEGEND

- SITE BOUNDARY
- PROPOSED ROOF AREA
- PROPOSED PERMEABLE HARDSTANDING AREA
- PRELIMINARY FLOOD EXCEEDANCE FLOW ROUTE ACROSS THE PROPOSED DEVELOPMENT SITE

WHERE POSSIBLE AND LAND TOPOGRAPHY PERMITS, ALL EXTERNAL HARD AND SOFT LANDSCAPING AREAS SHOULD BE DESIGNED TO FALL AWAY FROM THE PROPOSED DWELLINGS SO THAT IN THE EVENT OF A SEWER SURCHARGING OR OVERLAND FLOW FLOOD EVENT, THE FLOOD WATER WILL NOT ENTER THE BUILDINGS, BUT WILL INSTEAD FLOOD/POND EXTERNAL HARDSTANDING AND LANDSCAPING AREAS OR BECOME FLOOD ROUTED TOWARDS DITCH NETWORK LOCATED ADJACENT TO GARDEN-HOUSE LANE.

BLUE ARROWS INDICATE PROPOSED ROUTE OF OVERLAND FLOW ACROSS THE SITE.

THE FINISHED FLOOR LEVEL OF THE RESIDENTIAL DWELLINGS WILL BE SET AT A MINIMUM OF 150MM - 300MM ABOVE THE SURROUNDING GROUND LEVELS AND ADJACENT HIGHWAY/PRIVATE DRIVES.

THE FINISHED FLOOR LEVEL OF THE RESIDENTIAL DWELLINGS WILL BE SET AT A MINIMUM OF 150MM - 300MM ABOVE THE SURROUNDING GROUND LEVELS AND ADJACENT HIGHWAY/PRIVATE DRIVES.

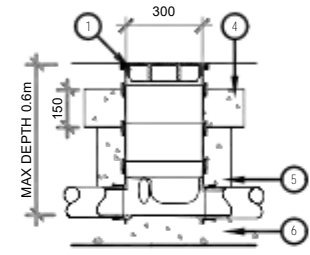
WHERE POSSIBLE AND LAND TOPOGRAPHY PERMITS, ALL EXTERNAL HARD AND SOFT LANDSCAPING AREAS SHOULD BE DESIGNED TO FALL AWAY FROM THE PROPOSED DWELLINGS SO THAT IN THE EVENT OF A SEWER SURCHARGING OR OVERLAND FLOW FLOOD EVENT, THE FLOOD WATER WILL NOT ENTER THE BUILDINGS, BUT WILL INSTEAD FLOOD/POND EXTERNAL HARDSTANDING AND LANDSCAPING AREAS OR BECOME FLOOD ROUTED TOWARDS DITCH NETWORK LOCATED ADJACENT TO GARDEN-HOUSE LANE.

BLUE ARROWS INDICATE PROPOSED ROUTE OF OVERLAND FLOW ACROSS THE SITE.

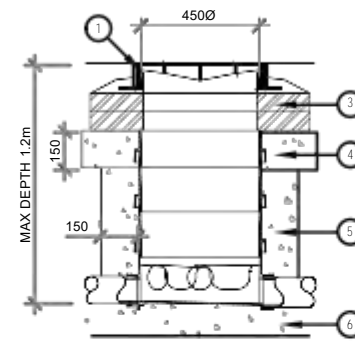


client: NAP ANGLIA LTD		project: LAND SOUTH OF GARDEN HOUSE LANE, RICKINGHALL, SUFFOLK	
discipline: CIVIL ENGINEERING			
drawn: RSM	chk'd: RSM	date: FEB 2022	scale: @ A1 / A3 / 1:500
project no: BLI.2020.62	dwg no: PL 105	rev: P1	status: COMMENT & APPROVAL

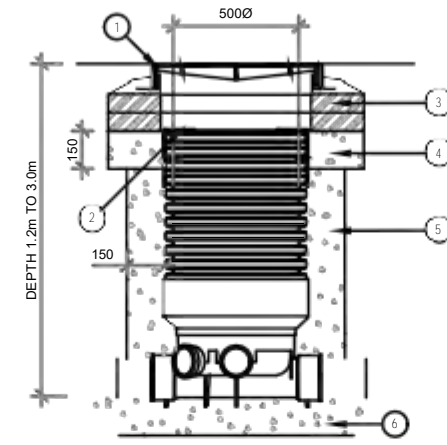
- COVER & FRAME TO BS EN 124 GRADE B125 UNLESS STATE OTHERWISE.
- FOR DEPTHS GREATER THAN 1.2m, USE RESTRICTOR CAP WITH 350mm OPENING AND SEALING RING
- TWO COURSES OF ENGINEERING BRICKWORK TO BE USED IN TRAFFICKED AREAS.
- 150mm DEEP ST2 CONCRETE COLLAR TO MANHOLE COVER AND FRAME TO BE USED IN TRAFFICKED AREAS. WIDTH OF CONCRETE COLLAR VARIES DEPENDING ON COVER INSTALLATION.
- 150mm ST2 CONCRETE SURROUND IN VEHICULAR AREAS. GRANULAR SURROUND ELSEWHERE.
- 150mm ST2 CONCRETE BED SURROUND IN VEHICULAR AREAS. GRANULAR SURROUND ELSEWHERE.



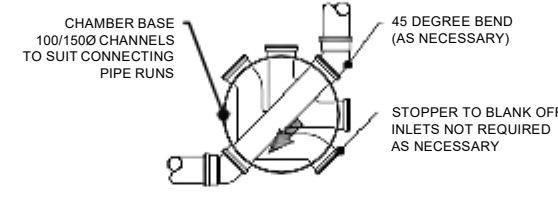
SHALLOW INSPECTION CHAMBER
(Maximum Depth 0.6m)



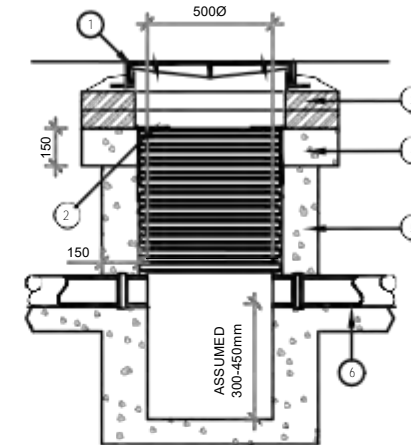
UNIVERSAL INSPECTION CHAMBER
(Maximum Depth 1.2m)



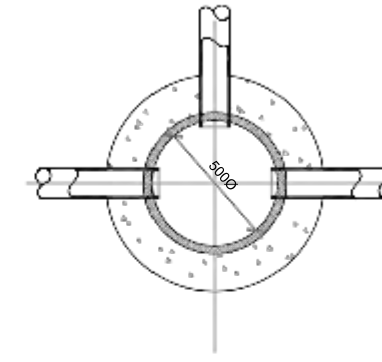
NON-ENTRY INSPECTION CHAMBER
(Maximum Depth 3.0m)



TYPICAL INSPECTION CHAMBER BASE PLAN



SILT TRAP INSPECTION CHAMBER



TYPICAL SILT TRAP CHAMBER BASE PLAN

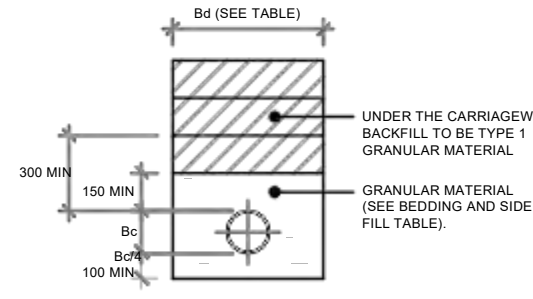
TYPICAL DETAILS FOR INSPECTION CHAMBERS
SCALE NTS

CONSTRUCTION NOTES

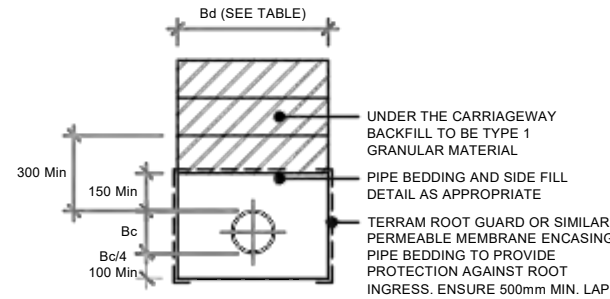
- All levels and grid co-ordinates have been established using GPS and relate to the Topographical Survey undertaken by Plandescil Ltd (Ref.20304).
- All dimensions are stated in millimetres unless shown otherwise and all existing/proposed levels are stated in metres Above Ordnance Datum (mAOD).
- Dimensions and co-ordinates should not be scaled from this drawing, if in doubt please contact BLI Consulting Engineers Ltd.
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PROTECTION TO PRIVATE SEWERS:-

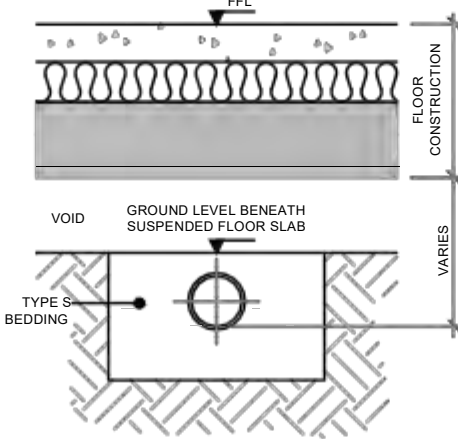
- Type S bedding to be used in non-trafficked areas.
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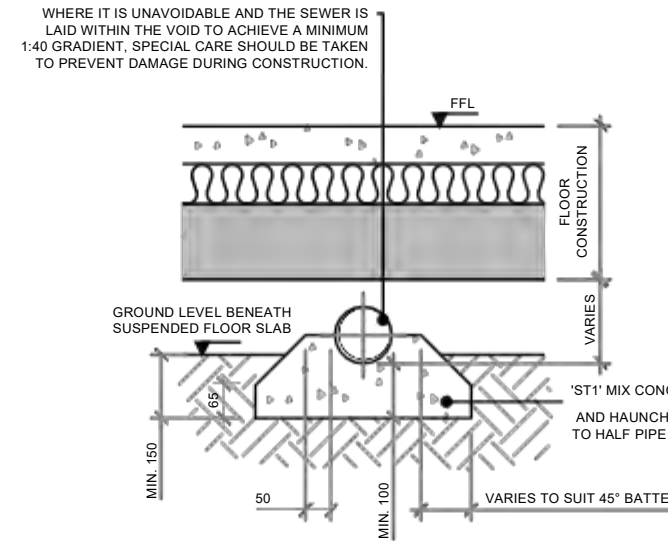
TYPE S



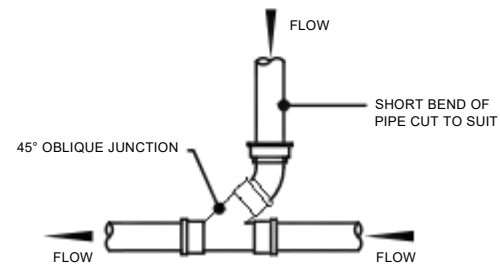
ROOT GUARD PROTECTION



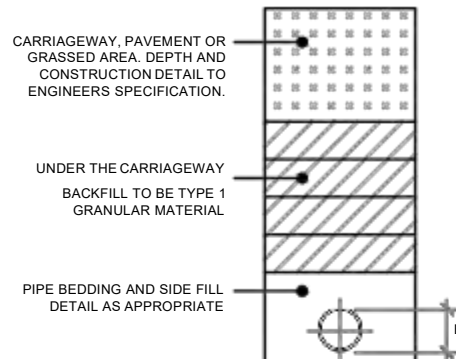
PIPE BEDDING DETAILS BELOW SUSPENDED FLOOR SLAB
SCALE 1:10



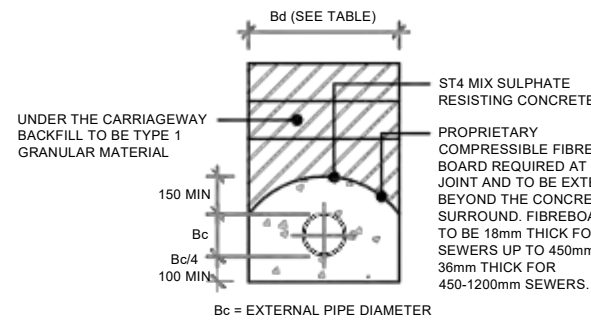
PIPE SUPPORT UNDER SUSPENDED FLOOR SLAB WHERE LESS THAN HALF PIPE DIAMETER IS BELOW GROUND LEVEL



INCOMING CONNECTION TO MAIN RUN
SCALE NTS



PIPE BACKFILL DETAIL



TYPE Z1

PIPE DIA (mm)	ALTERNATIVE AGGREGATE SIZES (mm)	
	SINGLE-SIZED	GRADED
100	10	-
150	10 or 14	14 to 5
225 - 300	10, 14 or 20	14 to 5 or 20 to 5
375 - 525	14 or 20	14 to 5 or 20 to 5
>525	14, 20 or 40	14 to 5, 20 to 5 or 40 to 5

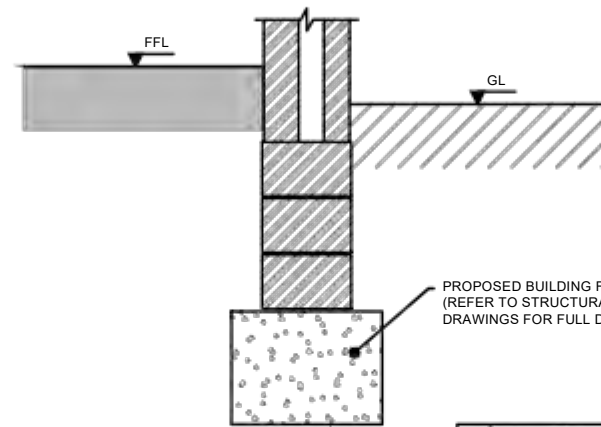
GRANULAR PIPE BEDDING AND SIDE FILL MATERIAL SHALL CONSIST OF AGGREGATES FROM NATURAL SOURCES OR SINTERED PULVERIZED-FUEL ASH COMPLYING WITH THE RELEVANT PROVISIONS OF BS 882 AND BS 3797, PART 2 RESPECTIVELY, SIZED IN ACCORDANCE WITH THE TABLE ABOVE.

TYPE S BEDDING AND SIDE FILL TABLE

PIPE DIA (mm)	TRENCH WIDTH Bd(mm) MAX. MEASURE 300mm ABOVE PIPE SOFFIT
100	550
150	600
225	700
300	750
375	1050
450	1150
525	1200
600	1350
675	1450
750	1500
825	1600
900	1900
1000	2000

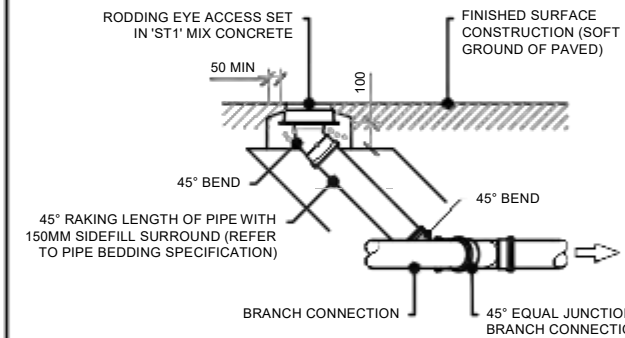
TRENCH WIDTH TABLE

PRIVATE PIPE BEDDING SPECIFICATION
SCALE 1:20

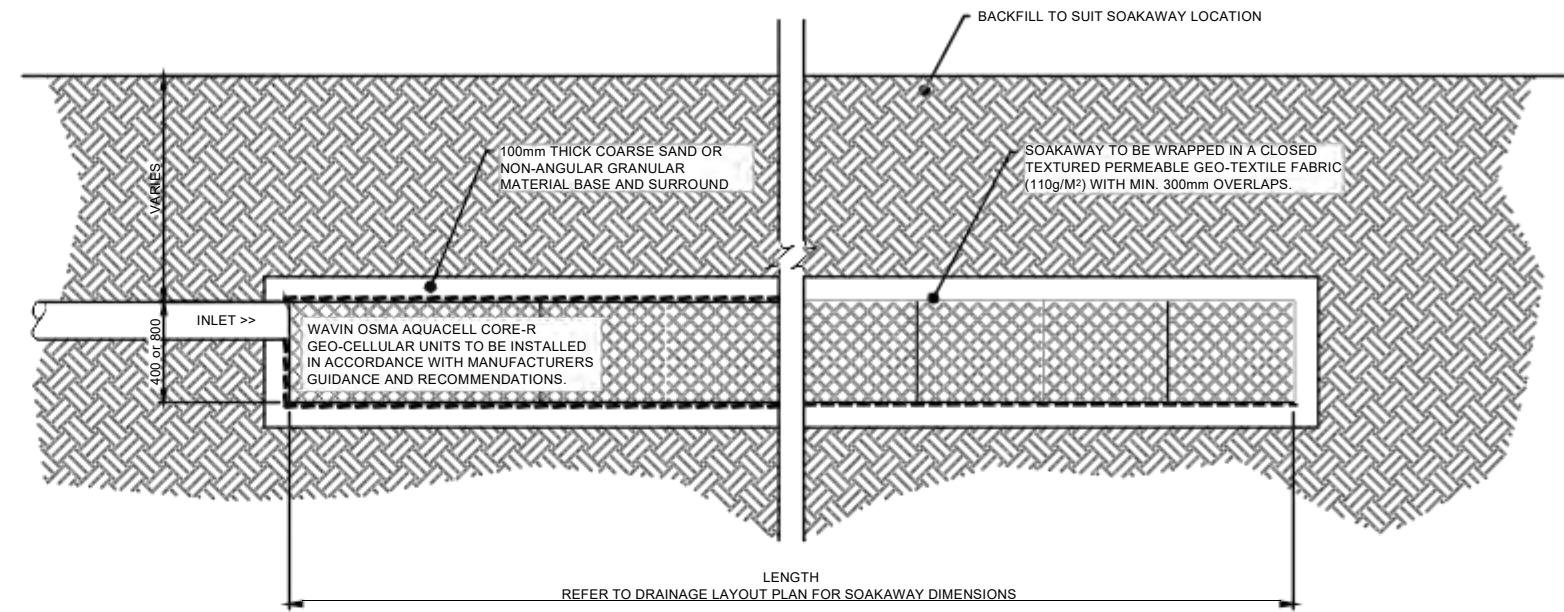
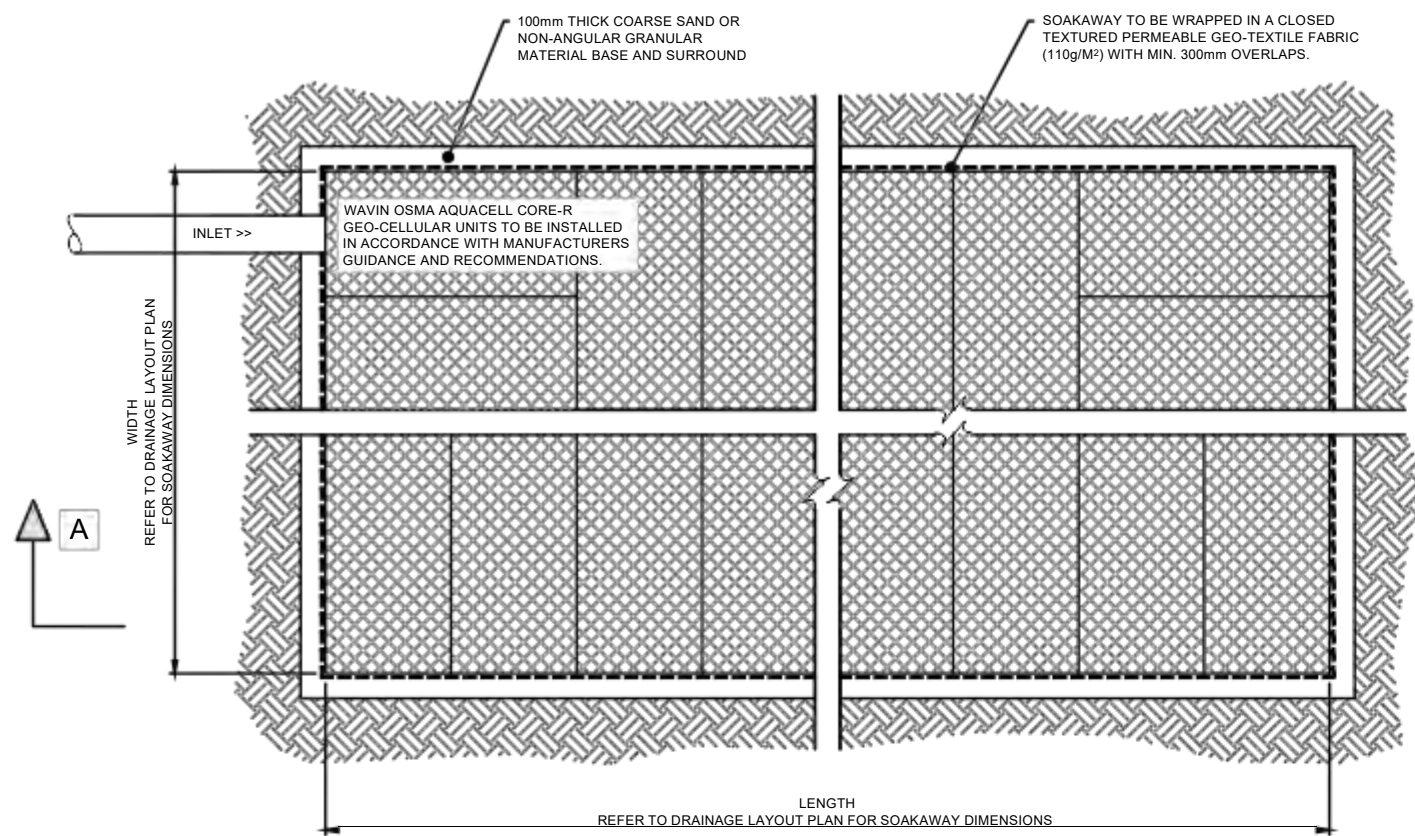


WHERE:
1) 'A' IS LESS THAN OR EQUAL TO 1m. FILL CONCRETE TRENCH UP TO THE LOWEST LEVEL OF THE FOUNDATION.
2) 'A' IS GREATER THAN 1m. FILL CONCRETE TRENCH UP A DEPTH FROM THE LOWEST LEVEL OF THE FOUNDATION DEFINED AS 'B' (SEE DIAGRAM). B = A - 150mm.

PIPE PROTECTION IN CLOSE PROXIMITY TO FOUNDATIONS
SCALE 1:20



TYPICAL RODDING EYE DETAIL
SCALE 1:20

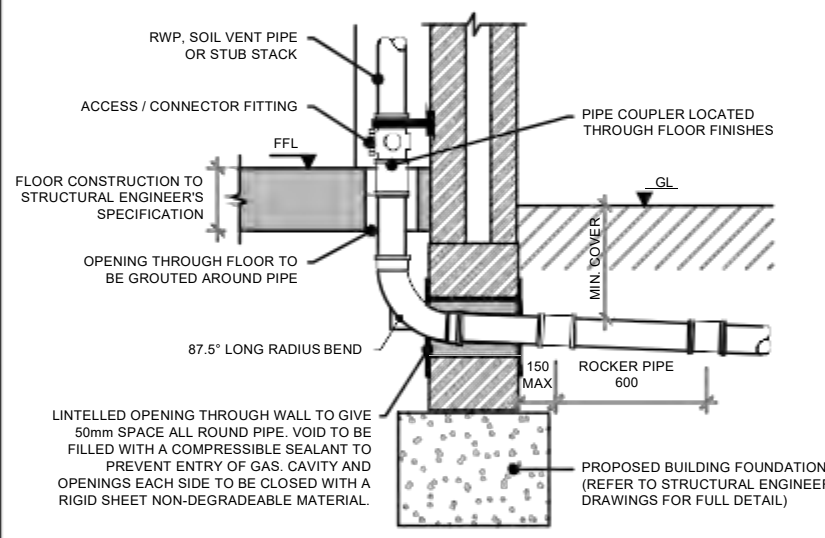


TYPICAL GEO-CELLULAR SOAKAWAY DETAIL
SCALE 1:20

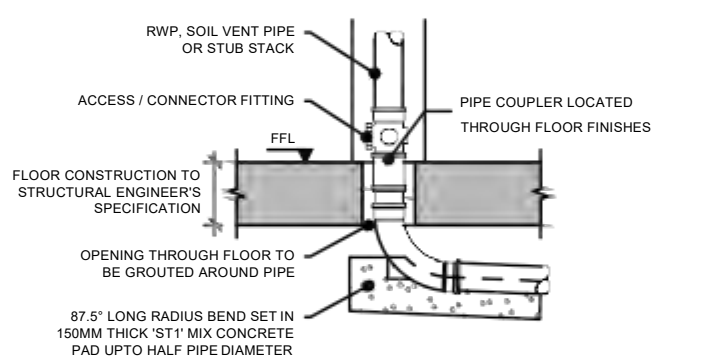
CONSTRUCTION NOTES

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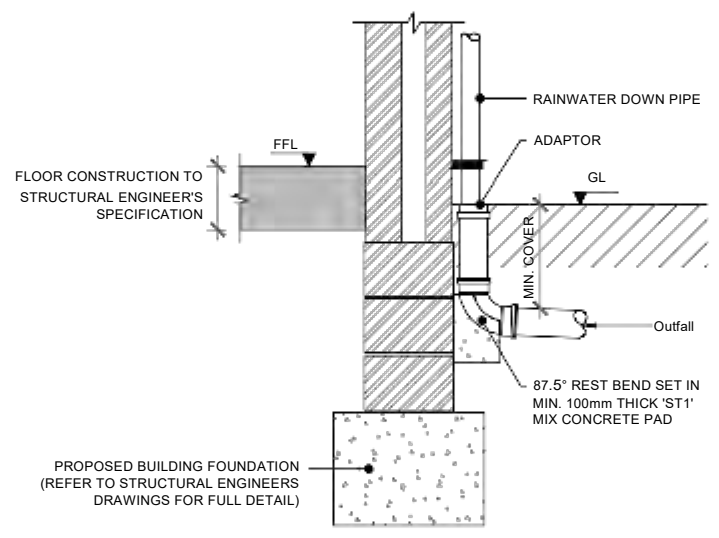
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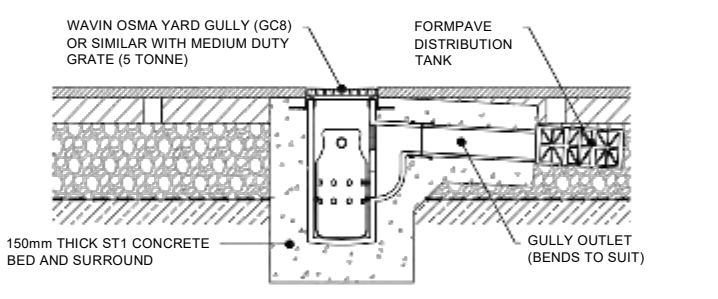
TYPICAL INTERNAL RAINWATER PIPE & SOIL VENT PIPE CONNECTION
SCALE 1:20



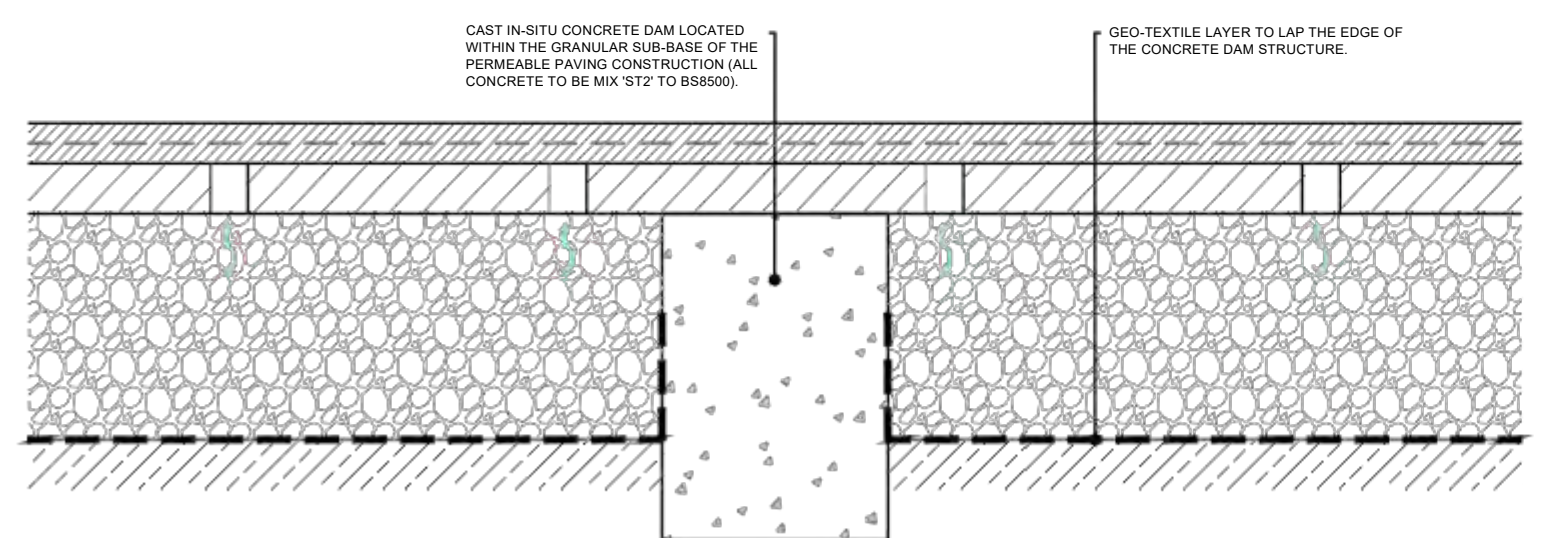
TYPICAL CONNECTION TO INTERNAL SOIL VENT PIPE CONNECTION
SCALE 1:20



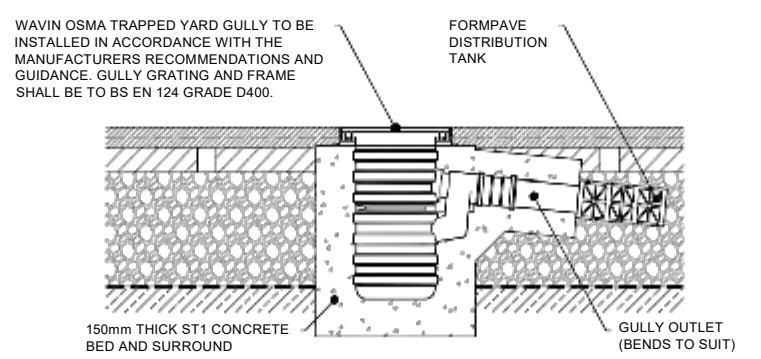
TYPICAL EXTERNAL RAINWATER PIPE CONNECTION
SCALE 1:20



PRIVATE DRIVEWAY - TYPICAL EXCEEDANCE GULLY DETAIL
SCALE 1:20



PERMEABLE PAVING - CONCRETE DAM STRUCTURE
1:10



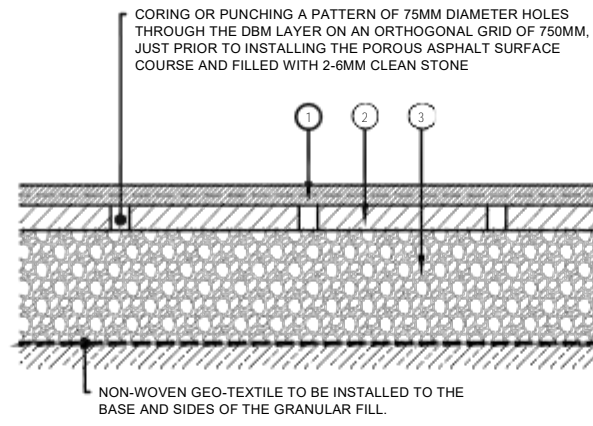
PRIVATE ROAD - TYPICAL EXCEEDANCE GULLY DETAIL
SCALE 1:20

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P1	25/02/22	First Issue	RSM	RSM
Rev.	Date	Description	Drawn	Chk'd

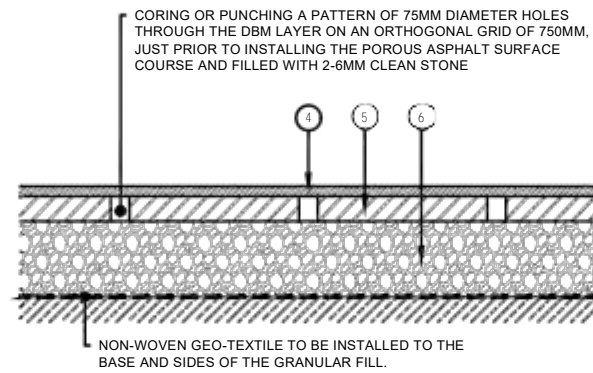
	client:	NAP ANGLIA LTD					
	project:	LAND SOUTH OF GARDEN HOUSE LANE, RICKINGHALL, SUFFOLK					
	dwg title:	CONSTRUCTION DETAILS (SHEET 2 OF 3)					
	discipline:	CIVIL ENGINEERING	drawn:	RSM			
project no.:	BLI.2020.62	dwg no.:	PL 107	date:	FEB 2022	scale @ A1/A3:	AS NOTED
rev.:	P1	status:	COMMENT & APPROVAL	client:	BLI Consulting Engineers Ltd		
					7 Melton Drive Norwich Norfolk NR8 6TT		
					T: 07918 725 983 richard.martin@bli-consulting.co.uk		

PRIVATE ROAD CONSTRUCTION				
	LAYER	SPECIFICATION	COMPACTED THICKNESS (mm)	
POROUS ASPHALT	1	SURFACE COURSE POROUS ASPHALT LAID IN ACCORDANCE WITH SUPPLIERS INSTALLATION GUIDANCE & RECOMMENDATION (TWO 40mm LAYERS OF 10mm SUPER-DRAIN ASPHALT PROVIDED BY AGGREGATE INDUSTRIES UK LIMITED OR EQUIVALENT)	80 (2 x 40)	
	2	BASE COURSE ASPHALT CONCRETE (AC 20 DENSE 40/60) TO PD6691:2015 ANNEX B. (2019) REFER TO ADJACENT DETAIL FOR CORING PATTERN OF 75MM DIAMETER HOLES.	100	
	3	SUB-BASE SUB-BASE COMPRISING OF COURSE GRADED AGGREGATE (4/20) TO BS7533-13:2009, LAID AND COMPACTED OVER A NON WOVEN GEO-TEXTILE LAYER (TO BASE AND SIDES). THE FORMATION SHALL BE SHAPED AND PREPARED TO CLAUSE 10.4.2 ⁽⁶⁾ AND TREATED WITH A GRANULAR WEED KILLER OF THE PRE-EMERGENT TYPE.	450 (Subject to onsite CBR testing of >5.0%)	
GENERAL FILL			EXTEND SUB-BASE CONSTRUCTION	AS REQUIRED



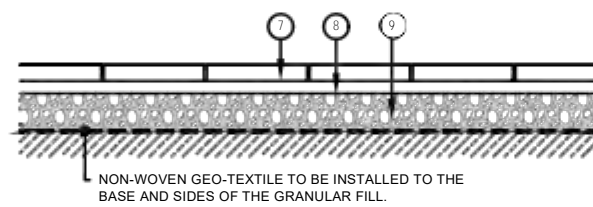
POROUS ASPHALT - PRIVATE ROAD CONSTRUCTION
SCALE 1:20

PRIVATE DRIVEWAY CONSTRUCTION				
	LAYER	SPECIFICATION	COMPACTED THICKNESS (mm)	
POROUS ASPHALT	4	SURFACE COURSE POROUS ASPHALT LAID IN ACCORDANCE WITH SUPPLIERS INSTALLATION GUIDANCE & RECOMMENDATION (A SINGLE 40mm LAYER OF 10mm SUPER-DRAIN ASPHALT PROVIDED BY AGGREGATE INDUSTRIES UK LIMITED OR EQUIVALENT)	40	
	5	BASE COURSE ASPHALT CONCRETE (AC 20 DENSE 40/60) TO PD6691:2015 ANNEX B. (2019) REFER TO ADJACENT DETAIL FOR CORING PATTERN OF 75MM DIAMETER HOLES.	100	
	6	SUB-BASE SUB-BASE COMPRISING OF COURSE GRADED AGGREGATE (4/20) TO BS7533-13:2009, LAID AND COMPACTED OVER A NON WOVEN GEO-TEXTILE LAYER (TO BASE AND SIDES). THE FORMATION SHALL BE SHAPED AND PREPARED TO CLAUSE 10.4.2 ⁽⁶⁾ AND TREATED WITH A GRANULAR WEED KILLER OF THE PRE-EMERGENT TYPE.	300 (Subject to onsite CBR testing of >5.0%)	
GENERAL FILL			EXTEND SUB-BASE CONSTRUCTION	AS REQUIRED



POROUS ASPHALT - PRIVATE DRIVEWAY CONSTRUCTION
SCALE 1:20

PRIVATE PATIO / FOOTWAY CONSTRUCTION				
	LAYER	SPECIFICATION	COMPACTED THICKNESS (mm)	
PERMEABLE PAVING FLAGS	7	SURFACE COURSE 900x600mm GOLDEN FOSSIL SANDSTONE PERMEABLE PAVING FLAGS LAID IN STACK BOND (INSTALLED TO MANUFACTURERS GUIDANCE & RECOMMENDATIONS).	40	
	8	LAYING COURSE 2.0-6.3mm NOMINAL SIZE CLEAN CRUSHED STONE TO BS7533-13:2009 LAID OVER A NON WOVEN GEOTEXTILE FILTER MEMBRANE. THE GEOTEXTILE SHALL BE BROUGHT UP THE SIDES OF THE LAYING COURSE AND SURFACE BLOCK AND TRIMMED OFF FLUSH AFTER LAYING	50	
	9	SUB-BASE SUB-BASE COMPRISING OF COURSE GRADED AGGREGATE (4/20) TO BS7533-13:2009, LAID AND COMPACTED OVER A NON WOVEN GEO-TEXTILE LAYER (TO BASE AND SIDES). THE FORMATION SHALL BE SHAPED AND PREPARED TO CLAUSE 10.4.2 ⁽⁶⁾ AND TREATED WITH A GRANULAR WEED KILLER OF THE PRE-EMERGENT TYPE.	150	
GENERAL FILL			EXTEND SUB-BASE CONSTRUCTION	AS REQUIRED



PERMEABLE PAVING FLAGS - PRIVATE PATIO & FOOTWAY CONSTRUCTION
SCALE 1:20

BEICIFICATION FOR PERMEABLE PAVEMENT CONSTRUCTION

BBGRADE/FORMATION PREPARATION:

THE SUBGRADE SHALL BE COMPACTED WITH A VIBRATING PLATE OR ROLLER TO THE REQUIREMENTS OF CLAUSE 613 OF THE SPECIFICATION FOR HIGHWAY WORKS (SHW). PRIOR TO COMPACT ALL SOFT AREAS SHALL BE REMOVED AND FILLED WITH A GRANULAR REPLACEMENT MATERIAL TO PROVIDE A STABLE SUBGRADE.

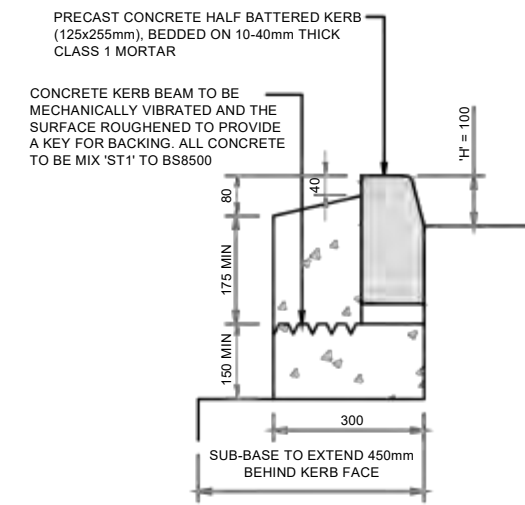
BBBASE-GENERALLY:

THE SUB-BASE MATERIAL SHALL BE TO BS7533-13 AND CONSIST OF ROUGH ANGULAR PARTICLES TO GIVE GOOD INTERLOCK. CLEAN CRUSHED ROCK (EG GRANITE, BASALT, GABBRO ETC) OR CONCRETE WITH GREATER THAN 90% FRACTURE FACES OR BLAST FURNACE SLAG IS REQUIRED TO ACHIEVE THIS. **SAND AND GRAVEL WITH ROUNDED PARTICLES SHALL NOT BE USED IN PERMEABLE PAVEMENT SUB-BASE CONSTRUCTION.** SUB-BASE MATERIAL MUST BE SOUND, NON-FRIABLE AND FREE FROM CLAY OR OTHER DELETERIOUS MATTER. THERE MUST BE A MINIMUM 10% FINES VALUE OF 150UM WHEN TESTED IN ACCORDANCE WITH BSEN1097-2 (PREVIOUSLY BS812 PART 111). COMPACTED WITH A VIBRATING ROLLER OR HEAVY DUTY VIBRATING PLATE TO THE REQUIREMENTS OF CLAUSE 802 OF 'SHW'. THE FINAL PASS SHOULD BE UNDERTAKEN WITH NO VIBRATION.

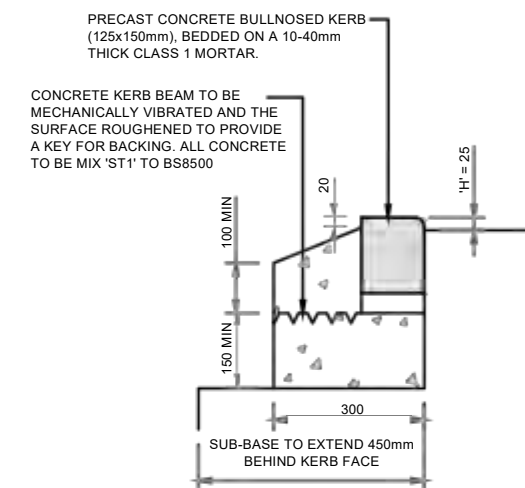
BB-BASE:

SUB-BASE SPECIFICATION (4/20) COMPLYING WITH BS 7533-13:2009 AND CONFORMING TO THE FOLLOWING SIEVE ANALYSIS:-

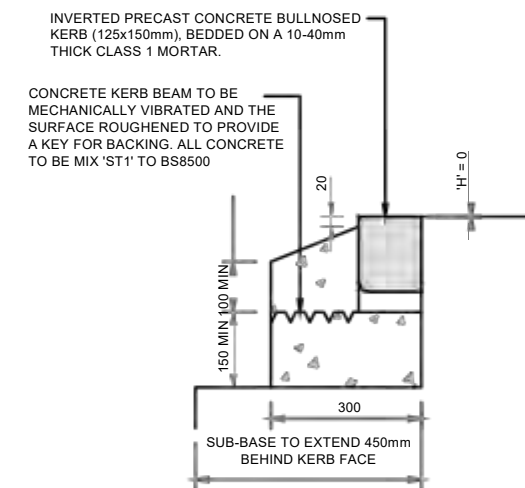
BSEN SIEVE SIZE	% PASSING
40mm	100
31.5mm	98-100
20mm	90-99
10mm	25-70
4mm	0-15
2mm	0-5



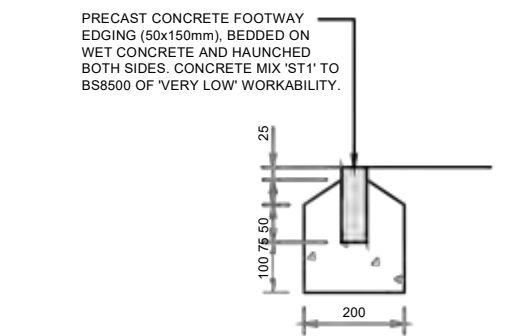
TYPICAL 'HB2' KERB (REF: 'KERB TYPE 1')



TYPICAL 'BN' KERB (REF: 'KERB TYPE 2')



TYPICAL INVERTED 'BN' KERB (REF: 'KERB TYPE 3')



TYPICAL EDGING KERB (REF: 'KERB TYPE 4')

TYPICAL KERB DETAILS
SCALE 1:10

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NOTES:

- HIGHWAYS ENGLAND SPECIFICATION FOR HIGHWAYS WORKS
- REFER TO BS EN 13108-1 FOR MATERIAL SPECIFICATION FOR ASPHALT CONCRETE
- REFER TO BS EN 13108-4 FOR MATERIAL SPECIFICATION FOR HOT ROLLED ASPHALT
- REFER TO BS EN 13108-5 FOR MATERIAL SPECIFICATION FOR STONE MASTIC ASPHALT
- REFER TO BS 594987 FOR TRANSPORT, LAYING AND COMPACTION OF ALL ASPHALT
- THE DESIGN IS BASED ON AN ASSUMED CBR VALUE AND SHALL BE SUBJECT TO AMENDMENT FOLLOWING ON-SITE SOAKED CBR TESTING.
- BOND COATS TO BE USED IN ACCORDANCE WITH BS59487 AND TO BE APPLIED ON ALL KERB AND EDGING FACES ALONG WITH GULLY AND COVER FRAMES. BOND COATS TO BE APPLIED ON TOP ON BASE AND BINDER COURSE, AS WELL AS JOINTS IN THE BINDER AND BASE COURSE TO BE OVER BANDED.
- SUFFOLK COUNTY COUNCIL SPECIFICATION FOR ESTATE ROADS (May 2007).

Appendix I

Surface Water Design Calculations

Contents

Pages 1 – 4	Soakaway (Plot 1A) - 100-Year (+40%) Simulation Results & Model Details
Pages 5 – 8	Soakaway (Plot 1B) - 100-Year (+40%) Simulation Results & Model Details
Pages 9 – 12	Soakaway (Plot 2) - 100-Year (+40%) Simulation Results & Model Details
Pages 13 – 16	Soakaway (Plot 3A) - 100-Year (+40%) Simulation Results & Model Details
Pages 17 – 20	Soakaway (Plot 3B) - 100-Year (+40%) Simulation Results & Model Details
Pages 21 – 24	Soakaway (Plot 4A) - 100-Year (+40%) Simulation Results & Model Details
Pages 25 – 28	Soakaway (Plot 4B) - 100-Year (+40%) Simulation Results & Model Details
Pages 29 – 32	Soakaway (Plot 5A) - 100-Year (+40%) Simulation Results & Model Details
Pages 33 – 36	Soakaway (Plot 5B) - 100-Year (+40%) Simulation Results & Model Details
Pages 37 – 40	Soakaway (Plot 6) - 100-Year (+40%) Simulation Results & Model Details
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Pages 45 – 48	Soakaway (Plot 8A) - 100-Year (+40%) Simulation Results & Model Details
Pages 49 – 52	Soakaway (Plot 8B) - 100-Year (+40%) Simulation Results & Model Details
Pages 53 – 56	Soakaway (Plot 9) - 100-Year (+40%) Simulation Results & Model Details
Pages 57 – 60	Soakaway (Plot 10) - 100-Year (+40%) Simulation Results & Model Details
Pages 61 – 64	Permeable Private Road - 100-Year (+40%) Simulation Results & Model Details
Pages 65 – 68	Permeable Driveway - 100-Year (+40%) Simulation Results & Model Details
Pages 69 – 72	Permeable Patio - 100-Year (+40%) Simulation Results & Model Details

Causeway Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 709 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.318	0.318	0.1	4.8	O K
30 min Summer	1.414	0.414	0.1	6.3	O K
60 min Summer	1.508	0.508	0.1	7.7	O K
120 min Summer	1.593	0.593	0.1	9.0	O K
180 min Summer	1.632	0.632	0.1	9.6	O K
240 min Summer	1.652	0.652	0.1	9.9	O K
360 min Summer	1.667	0.667	0.1	10.1	O K
480 min Summer	1.666	0.666	0.1	10.1	O K
600 min Summer	1.659	0.659	0.1	10.0	O K
720 min Summer	1.652	0.652	0.1	9.9	O K
960 min Summer	1.636	0.636	0.1	9.7	O K
1440 min Summer	1.600	0.600	0.1	9.1	O K
2160 min Summer	1.547	0.547	0.1	8.3	O K
2880 min Summer	1.500	0.500	0.1	7.6	O K
4320 min Summer	1.417	0.417	0.1	6.3	O K
5760 min Summer	1.348	0.348	0.1	5.3	O K
7200 min Summer	1.289	0.289	0.1	4.4	O K
8640 min Summer	1.239	0.239	0.1	3.6	O K
10080 min Summer	1.196	0.196	0.1	3.0	O K
15 min Winter	1.357	0.357	0.1	5.4	O K
30 min Winter	1.464	0.464	0.1	7.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	360
480 min Summer	11.622	0.0	478
600 min Summer	9.738	0.0	524
720 min Summer	8.424	0.0	588
960 min Summer	6.697	0.0	712
1440 min Summer	4.839	0.0	982
2160 min Summer	3.490	0.0	1404
2880 min Summer	2.766	0.0	1816
4320 min Summer	1.989	0.0	2596
5760 min Summer	1.573	0.0	3392
7200 min Summer	1.311	0.0	4112
8640 min Summer	1.129	0.0	4848
10080 min Summer	0.994	0.0	5552
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

Norwich

Residential Development

Norfolk

Garden House Lane

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Rickingham, Suffolk

Date 11/02/2022

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.571	0.571	0.1	8.7	O K
120 min Winter	1.669	0.669	0.1	10.2	O K
180 min Winter	1.715	0.715	0.2	10.9	O K
240 min Winter	1.739	0.739	0.2	11.2	O K
360 min Winter	1.762	0.762	0.2	11.6	O K
480 min Winter	1.766	0.766	0.2	11.7	O K
600 min Winter	1.761	0.761	0.2	11.6	O K
720 min Winter	1.751	0.751	0.2	11.4	O K
960 min Winter	1.731	0.731	0.2	11.1	O K
1440 min Winter	1.684	0.684	0.2	10.4	O K
2160 min Winter	1.611	0.611	0.1	9.3	O K
2880 min Winter	1.542	0.542	0.1	8.2	O K
4320 min Winter	1.423	0.423	0.1	6.4	O K
5760 min Winter	1.326	0.326	0.1	5.0	O K
7200 min Winter	1.247	0.247	0.1	3.8	O K
8640 min Winter	1.182	0.182	0.1	2.8	O K
10080 min Winter	1.129	0.129	0.1	2.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	236
360 min Winter	14.585	0.0	350
480 min Winter	11.622	0.0	462
600 min Winter	9.738	0.0	568
720 min Winter	8.424	0.0	664
960 min Winter	6.697	0.0	750
1440 min Winter	4.839	0.0	1056
2160 min Winter	3.490	0.0	1512
2880 min Winter	2.766	0.0	1956
4320 min Winter	1.989	0.0	2768
5760 min Winter	1.573	0.0	3576
7200 min Winter	1.311	0.0	4328
8640 min Winter	1.129	0.0	5024
10080 min Winter	0.994	0.0	5744

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Residential Development
Garden House Lane
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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.019

Time (mins) Area
From: To: (ha)

0 4 0.019

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Residential Development
Garden House Lane
Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	16.0	16.0	0.800	16.0	32.0	0.900	0.0	32.0

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Residential Development
Garden House Lane
Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 444 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.177	0.177	0.1	1.5	O K
30 min Summer	1.229	0.229	0.1	2.0	O K
60 min Summer	1.279	0.279	0.1	2.4	O K
120 min Summer	1.320	0.320	0.1	2.7	O K
180 min Summer	1.335	0.335	0.1	2.9	O K
240 min Summer	1.340	0.340	0.1	2.9	O K
360 min Summer	1.337	0.337	0.1	2.9	O K
480 min Summer	1.332	0.332	0.1	2.8	O K
600 min Summer	1.326	0.326	0.1	2.8	O K
720 min Summer	1.319	0.319	0.1	2.7	O K
960 min Summer	1.304	0.304	0.1	2.6	O K
1440 min Summer	1.275	0.275	0.1	2.4	O K
2160 min Summer	1.236	0.236	0.1	2.0	O K
2880 min Summer	1.201	0.201	0.1	1.7	O K
4320 min Summer	1.145	0.145	0.1	1.2	O K
5760 min Summer	1.103	0.103	0.1	0.9	O K
7200 min Summer	1.074	0.074	0.1	0.6	O K
8640 min Summer	1.056	0.056	0.0	0.5	O K
10080 min Summer	1.048	0.048	0.0	0.4	O K
15 min Winter	1.198	0.198	0.1	1.7	O K
30 min Winter	1.257	0.257	0.1	2.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	33
60 min Summer	56.713	0.0	62
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	240
360 min Summer	14.585	0.0	324
480 min Summer	11.622	0.0	382
600 min Summer	9.738	0.0	446
720 min Summer	8.424	0.0	512
960 min Summer	6.697	0.0	648
1440 min Summer	4.839	0.0	924
2160 min Summer	3.490	0.0	1320
2880 min Summer	2.766	0.0	1728
4320 min Summer	1.989	0.0	2464
5760 min Summer	1.573	0.0	3168
7200 min Summer	1.311	0.0	3824
8640 min Summer	1.129	0.0	4496
10080 min Summer	0.994	0.0	5144
15 min Winter	138.153	0.0	18
30 min Winter	90.705	0.0	33

Norwich

Residential Development

Norfolk

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Rickingham, Suffolk

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.314	0.314	0.1	2.7	O K
120 min Winter	1.362	0.362	0.1	3.1	O K
180 min Winter	1.381	0.381	0.1	3.3	O K
240 min Winter	1.389	0.389	0.1	3.3	O K
360 min Winter	1.389	0.389	0.1	3.3	O K
480 min Winter	1.381	0.381	0.1	3.3	O K
600 min Winter	1.373	0.373	0.1	3.2	O K
720 min Winter	1.365	0.365	0.1	3.1	O K
960 min Winter	1.345	0.345	0.1	2.9	O K
1440 min Winter	1.303	0.303	0.1	2.6	O K
2160 min Winter	1.244	0.244	0.1	2.1	O K
2880 min Winter	1.194	0.194	0.1	1.7	O K
4320 min Winter	1.117	0.117	0.1	1.0	O K
5760 min Winter	1.065	0.065	0.0	0.6	O K
7200 min Winter	1.047	0.047	0.0	0.4	O K
8640 min Winter	1.041	0.041	0.0	0.3	O K
10080 min Winter	1.036	0.036	0.0	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	178
240 min Winter	20.078	0.0	234
360 min Winter	14.585	0.0	344
480 min Winter	11.622	0.0	438
600 min Winter	9.738	0.0	472
720 min Winter	8.424	0.0	548
960 min Winter	6.697	0.0	702
1440 min Winter	4.839	0.0	998
2160 min Winter	3.490	0.0	1428
2880 min Winter	2.766	0.0	1820
4320 min Winter	1.989	0.0	2552
5760 min Winter	1.573	0.0	3176
7200 min Winter	1.311	0.0	3744
8640 min Winter	1.129	0.0	4480
10080 min Winter	0.994	0.0	5144

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.006

Time (mins) Area
From: To: (ha)

0 4 0.006

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.400

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	9.0	9.0	0.400	9.0	14.2	0.500	0.0	14.2

Causeway Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 730 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.321	0.321	0.1	6.1	O K
30 min Summer	1.418	0.418	0.2	7.9	O K
60 min Summer	1.514	0.514	0.2	9.8	O K
120 min Summer	1.600	0.600	0.2	11.4	O K
180 min Summer	1.640	0.640	0.2	12.2	O K
240 min Summer	1.660	0.660	0.2	12.5	O K
360 min Summer	1.676	0.676	0.2	12.9	O K
480 min Summer	1.677	0.677	0.2	12.9	O K
600 min Summer	1.670	0.670	0.2	12.7	O K
720 min Summer	1.663	0.663	0.2	12.6	O K
960 min Summer	1.646	0.646	0.2	12.3	O K
1440 min Summer	1.610	0.610	0.2	11.6	O K
2160 min Summer	1.558	0.558	0.2	10.6	O K
2880 min Summer	1.511	0.511	0.2	9.7	O K
4320 min Summer	1.428	0.428	0.2	8.1	O K
5760 min Summer	1.357	0.357	0.1	6.8	O K
7200 min Summer	1.297	0.297	0.1	5.6	O K
8640 min Summer	1.247	0.247	0.1	4.7	O K
10080 min Summer	1.203	0.203	0.1	3.9	O K
15 min Winter	1.360	0.360	0.1	6.8	O K
30 min Winter	1.470	0.470	0.2	8.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	360
480 min Summer	11.622	0.0	480
600 min Summer	9.738	0.0	536
720 min Summer	8.424	0.0	594
960 min Summer	6.697	0.0	720
1440 min Summer	4.839	0.0	984
2160 min Summer	3.490	0.0	1404
2880 min Summer	2.766	0.0	1816
4320 min Summer	1.989	0.0	2596
5760 min Summer	1.573	0.0	3400
7200 min Summer	1.311	0.0	4112
8640 min Summer	1.129	0.0	4848
10080 min Summer	0.994	0.0	5552
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

Norwich

Residential Development

Norfolk

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Rickingham, Suffolk

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Winter	1.578	0.578	0.2	11.0	O K
120 min Winter	1.677	0.677	0.2	12.9	O K
180 min Winter	1.724	0.724	0.2	13.8	O K
240 min Winter	1.749	0.749	0.2	14.2	O K
360 min Winter	1.773	0.773	0.2	14.7	O K
480 min Winter	1.778	0.778	0.2	14.8	O K
600 min Winter	1.774	0.774	0.2	14.7	O K
720 min Winter	1.764	0.764	0.2	14.5	O K
960 min Winter	1.743	0.743	0.2	14.1	O K
1440 min Winter	1.698	0.698	0.2	13.3	O K
2160 min Winter	1.624	0.624	0.2	11.9	O K
2880 min Winter	1.555	0.555	0.2	10.5	O K
4320 min Winter	1.436	0.436	0.2	8.3	O K
5760 min Winter	1.338	0.338	0.1	6.4	O K
7200 min Winter	1.257	0.257	0.1	4.9	O K
8640 min Winter	1.190	0.190	0.1	3.6	O K
10080 min Winter	1.136	0.136	0.1	2.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	238
360 min Winter	14.585	0.0	352
480 min Winter	11.622	0.0	462
600 min Winter	9.738	0.0	570
720 min Winter	8.424	0.0	670
960 min Winter	6.697	0.0	754
1440 min Winter	4.839	0.0	1066
2160 min Winter	3.490	0.0	1516
2880 min Winter	2.766	0.0	1960
4320 min Winter	1.989	0.0	2808
5760 min Winter	1.573	0.0	3576
7200 min Winter	1.311	0.0	4328
8640 min Winter	1.129	0.0	5096
10080 min Winter	0.994	0.0	5752

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Residential Development
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Date 11/02/2022
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Causeway Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.024

Time (mins) Area
From: To: (ha)

0 4 0.024

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	20.0	20.0	0.800	20.0	39.2	0.900	0.0	39.2

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Residential Development

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Garden House Lane

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Rickingham, Suffolk

Date 11/02/2022

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 709 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.315	0.315	0.1	5.1	O K
30 min Summer	1.410	0.410	0.1	6.6	O K
60 min Summer	1.503	0.503	0.1	8.1	O K
120 min Summer	1.587	0.587	0.1	9.5	O K
180 min Summer	1.626	0.626	0.2	10.1	O K
240 min Summer	1.645	0.645	0.2	10.4	O K
360 min Summer	1.660	0.660	0.2	10.7	O K
480 min Summer	1.659	0.659	0.2	10.6	O K
600 min Summer	1.653	0.653	0.2	10.5	O K
720 min Summer	1.646	0.646	0.2	10.4	O K
960 min Summer	1.629	0.629	0.2	10.2	O K
1440 min Summer	1.593	0.593	0.1	9.6	O K
2160 min Summer	1.541	0.541	0.1	8.7	O K
2880 min Summer	1.494	0.494	0.1	8.0	O K
4320 min Summer	1.412	0.412	0.1	6.7	O K
5760 min Summer	1.343	0.343	0.1	5.5	O K
7200 min Summer	1.284	0.284	0.1	4.6	O K
8640 min Summer	1.234	0.234	0.1	3.8	O K
10080 min Summer	1.192	0.192	0.1	3.1	O K
15 min Winter	1.353	0.353	0.1	5.7	O K
30 min Winter	1.460	0.460	0.1	7.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	360
480 min Summer	11.622	0.0	478
600 min Summer	9.738	0.0	526
720 min Summer	8.424	0.0	590
960 min Summer	6.697	0.0	712
1440 min Summer	4.839	0.0	982
2160 min Summer	3.490	0.0	1404
2880 min Summer	2.766	0.0	1816
4320 min Summer	1.989	0.0	2596
5760 min Summer	1.573	0.0	3392
7200 min Summer	1.311	0.0	4112
8640 min Summer	1.129	0.0	4848
10080 min Summer	0.994	0.0	5552
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

Causeway Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Winter	1.566	0.566	0.1	9.1	O K
120 min Winter	1.663	0.663	0.2	10.7	O K
180 min Winter	1.708	0.708	0.2	11.4	O K
240 min Winter	1.732	0.732	0.2	11.8	O K
360 min Winter	1.754	0.754	0.2	12.2	O K
480 min Winter	1.759	0.759	0.2	12.3	O K
600 min Winter	1.754	0.754	0.2	12.2	O K
720 min Winter	1.744	0.744	0.2	12.0	O K
960 min Winter	1.723	0.723	0.2	11.7	O K
1440 min Winter	1.677	0.677	0.2	10.9	O K
2160 min Winter	1.604	0.604	0.1	9.8	O K
2880 min Winter	1.536	0.536	0.1	8.6	O K
4320 min Winter	1.418	0.418	0.1	6.7	O K
5760 min Winter	1.321	0.321	0.1	5.2	O K
7200 min Winter	1.242	0.242	0.1	3.9	O K
8640 min Winter	1.177	0.177	0.1	2.9	O K
10080 min Winter	1.125	0.125	0.1	2.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	236
360 min Winter	14.585	0.0	350
480 min Winter	11.622	0.0	462
600 min Winter	9.738	0.0	568
720 min Winter	8.424	0.0	666
960 min Winter	6.697	0.0	752
1440 min Winter	4.839	0.0	1056
2160 min Winter	3.490	0.0	1512
2880 min Winter	2.766	0.0	1956
4320 min Winter	1.989	0.0	2768
5760 min Winter	1.573	0.0	3576
7200 min Winter	1.311	0.0	4328
8640 min Winter	1.129	0.0	5024
10080 min Winter	0.994	0.0	5744

Norwich
 Norfolk
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Residential Development
 Garden House Lane
 Rickingham, Suffolk



Date 11/02/2022
 File M100+CC_SOAKAWAY_PLOT 3A.SRCX

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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.020

Time (mins) Area
From: To: (ha)

0 4 0.020

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 3A.SRCX

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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	17.0	17.0	0.800	17.0	33.8	0.900	0.0	33.8

Norwich

Residential Development

Norfolk

Garden House Lane

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Rickingham, Suffolk

Date 11/02/2022

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 444 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.177	0.177	0.1	1.5	O K
30 min Summer	1.229	0.229	0.1	2.0	O K
60 min Summer	1.279	0.279	0.1	2.4	O K
120 min Summer	1.320	0.320	0.1	2.7	O K
180 min Summer	1.335	0.335	0.1	2.9	O K
240 min Summer	1.340	0.340	0.1	2.9	O K
360 min Summer	1.337	0.337	0.1	2.9	O K
480 min Summer	1.332	0.332	0.1	2.8	O K
600 min Summer	1.326	0.326	0.1	2.8	O K
720 min Summer	1.319	0.319	0.1	2.7	O K
960 min Summer	1.304	0.304	0.1	2.6	O K
1440 min Summer	1.275	0.275	0.1	2.4	O K
2160 min Summer	1.236	0.236	0.1	2.0	O K
2880 min Summer	1.201	0.201	0.1	1.7	O K
4320 min Summer	1.145	0.145	0.1	1.2	O K
5760 min Summer	1.103	0.103	0.1	0.9	O K
7200 min Summer	1.074	0.074	0.1	0.6	O K
8640 min Summer	1.056	0.056	0.0	0.5	O K
10080 min Summer	1.048	0.048	0.0	0.4	O K
15 min Winter	1.198	0.198	0.1	1.7	O K
30 min Winter	1.257	0.257	0.1	2.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	33
60 min Summer	56.713	0.0	62
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	240
360 min Summer	14.585	0.0	324
480 min Summer	11.622	0.0	382
600 min Summer	9.738	0.0	446
720 min Summer	8.424	0.0	512
960 min Summer	6.697	0.0	648
1440 min Summer	4.839	0.0	924
2160 min Summer	3.490	0.0	1320
2880 min Summer	2.766	0.0	1728
4320 min Summer	1.989	0.0	2464
5760 min Summer	1.573	0.0	3168
7200 min Summer	1.311	0.0	3824
8640 min Summer	1.129	0.0	4496
10080 min Summer	0.994	0.0	5144
15 min Winter	138.153	0.0	18
30 min Winter	90.705	0.0	33

Norwich

Residential Development

Norfolk

Garden House Lane

.

Rickingham, Suffolk

Date 11/02/2022

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File M100+CC_SOAKAWAY_PLOT 3B.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.314	0.314	0.1	2.7	O K
120 min Winter	1.362	0.362	0.1	3.1	O K
180 min Winter	1.381	0.381	0.1	3.3	O K
240 min Winter	1.389	0.389	0.1	3.3	O K
360 min Winter	1.389	0.389	0.1	3.3	O K
480 min Winter	1.381	0.381	0.1	3.3	O K
600 min Winter	1.373	0.373	0.1	3.2	O K
720 min Winter	1.365	0.365	0.1	3.1	O K
960 min Winter	1.345	0.345	0.1	2.9	O K
1440 min Winter	1.303	0.303	0.1	2.6	O K
2160 min Winter	1.244	0.244	0.1	2.1	O K
2880 min Winter	1.194	0.194	0.1	1.7	O K
4320 min Winter	1.117	0.117	0.1	1.0	O K
5760 min Winter	1.065	0.065	0.0	0.6	O K
7200 min Winter	1.047	0.047	0.0	0.4	O K
8640 min Winter	1.041	0.041	0.0	0.3	O K
10080 min Winter	1.036	0.036	0.0	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	178
240 min Winter	20.078	0.0	234
360 min Winter	14.585	0.0	344
480 min Winter	11.622	0.0	438
600 min Winter	9.738	0.0	472
720 min Winter	8.424	0.0	548
960 min Winter	6.697	0.0	702
1440 min Winter	4.839	0.0	998
2160 min Winter	3.490	0.0	1428
2880 min Winter	2.766	0.0	1820
4320 min Winter	1.989	0.0	2552
5760 min Winter	1.573	0.0	3176
7200 min Winter	1.311	0.0	3744
8640 min Winter	1.129	0.0	4480
10080 min Winter	0.994	0.0	5144

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 3B.SRCX

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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.006

Time (mins) Area
From: To: (ha)

0 4 0.006

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 3B.SRCX

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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.400

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	9.0	9.0	0.400	9.0	14.2	0.500	0.0	14.2

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 4A.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 710 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.321	0.321	0.1	4.6	O K
30 min Summer	1.418	0.418	0.1	6.0	O K
60 min Summer	1.513	0.513	0.1	7.3	O K
120 min Summer	1.599	0.599	0.1	8.5	O K
180 min Summer	1.639	0.639	0.1	9.1	O K
240 min Summer	1.659	0.659	0.1	9.4	O K
360 min Summer	1.674	0.674	0.1	9.6	O K
480 min Summer	1.673	0.673	0.1	9.6	O K
600 min Summer	1.667	0.667	0.1	9.5	O K
720 min Summer	1.659	0.659	0.1	9.4	O K
960 min Summer	1.643	0.643	0.1	9.2	O K
1440 min Summer	1.607	0.607	0.1	8.6	O K
2160 min Summer	1.554	0.554	0.1	7.9	O K
2880 min Summer	1.506	0.506	0.1	7.2	O K
4320 min Summer	1.423	0.423	0.1	6.0	O K
5760 min Summer	1.353	0.353	0.1	5.0	O K
7200 min Summer	1.294	0.294	0.1	4.2	O K
8640 min Summer	1.243	0.243	0.1	3.5	O K
10080 min Summer	1.201	0.201	0.1	2.9	O K
15 min Winter	1.360	0.360	0.1	5.1	O K
30 min Winter	1.469	0.469	0.1	6.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	360
480 min Summer	11.622	0.0	478
600 min Summer	9.738	0.0	524
720 min Summer	8.424	0.0	588
960 min Summer	6.697	0.0	712
1440 min Summer	4.839	0.0	982
2160 min Summer	3.490	0.0	1404
2880 min Summer	2.766	0.0	1816
4320 min Summer	1.989	0.0	2596
5760 min Summer	1.573	0.0	3400
7200 min Summer	1.311	0.0	4112
8640 min Summer	1.129	0.0	4848
10080 min Summer	0.994	0.0	5552
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

Norwich

Residential Development

Norfolk

Garden House Lane

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Rickingham, Suffolk

Date 11/02/2022

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File M100+CC_SOAKAWAY_PLOT 4A.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.577	0.577	0.1	8.2	O K
120 min Winter	1.676	0.676	0.1	9.6	O K
180 min Winter	1.723	0.723	0.1	10.3	O K
240 min Winter	1.747	0.747	0.1	10.7	O K
360 min Winter	1.770	0.770	0.1	11.0	O K
480 min Winter	1.775	0.775	0.2	11.0	O K
600 min Winter	1.770	0.770	0.1	11.0	O K
720 min Winter	1.759	0.759	0.1	10.8	O K
960 min Winter	1.739	0.739	0.1	10.5	O K
1440 min Winter	1.692	0.692	0.1	9.9	O K
2160 min Winter	1.618	0.618	0.1	8.8	O K
2880 min Winter	1.549	0.549	0.1	7.8	O K
4320 min Winter	1.430	0.430	0.1	6.1	O K
5760 min Winter	1.332	0.332	0.1	4.7	O K
7200 min Winter	1.252	0.252	0.1	3.6	O K
8640 min Winter	1.187	0.187	0.1	2.7	O K
10080 min Winter	1.133	0.133	0.1	1.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	236
360 min Winter	14.585	0.0	350
480 min Winter	11.622	0.0	462
600 min Winter	9.738	0.0	568
720 min Winter	8.424	0.0	664
960 min Winter	6.697	0.0	750
1440 min Winter	4.839	0.0	1056
2160 min Winter	3.490	0.0	1512
2880 min Winter	2.766	0.0	1956
4320 min Winter	1.989	0.0	2768
5760 min Winter	1.573	0.0	3576
7200 min Winter	1.311	0.0	4328
8640 min Winter	1.129	0.0	5024
10080 min Winter	0.994	0.0	5752

Norwich
 Norfolk
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Residential Development
 Garden House Lane
 Rickingham, Suffolk



Date 11/02/2022
 File M100+CC_SOAKAWAY_PLOT 4A.SRCX

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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.018

Time (mins) Area
From: To: (ha)

0 4 0.018

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 4A.SRCX

Designed by RSM
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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	15.0	15.0	0.800	15.0	30.2	0.900	0.0	30.2

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 4B.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 444 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.177	0.177	0.1	1.5	O K
30 min Summer	1.229	0.229	0.1	2.0	O K
60 min Summer	1.279	0.279	0.1	2.4	O K
120 min Summer	1.320	0.320	0.1	2.7	O K
180 min Summer	1.335	0.335	0.1	2.9	O K
240 min Summer	1.340	0.340	0.1	2.9	O K
360 min Summer	1.337	0.337	0.1	2.9	O K
480 min Summer	1.332	0.332	0.1	2.8	O K
600 min Summer	1.326	0.326	0.1	2.8	O K
720 min Summer	1.319	0.319	0.1	2.7	O K
960 min Summer	1.304	0.304	0.1	2.6	O K
1440 min Summer	1.275	0.275	0.1	2.4	O K
2160 min Summer	1.236	0.236	0.1	2.0	O K
2880 min Summer	1.201	0.201	0.1	1.7	O K
4320 min Summer	1.145	0.145	0.1	1.2	O K
5760 min Summer	1.103	0.103	0.1	0.9	O K
7200 min Summer	1.074	0.074	0.1	0.6	O K
8640 min Summer	1.056	0.056	0.0	0.5	O K
10080 min Summer	1.048	0.048	0.0	0.4	O K
15 min Winter	1.198	0.198	0.1	1.7	O K
30 min Winter	1.257	0.257	0.1	2.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	33
60 min Summer	56.713	0.0	62
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	240
360 min Summer	14.585	0.0	324
480 min Summer	11.622	0.0	382
600 min Summer	9.738	0.0	446
720 min Summer	8.424	0.0	512
960 min Summer	6.697	0.0	648
1440 min Summer	4.839	0.0	924
2160 min Summer	3.490	0.0	1320
2880 min Summer	2.766	0.0	1728
4320 min Summer	1.989	0.0	2464
5760 min Summer	1.573	0.0	3168
7200 min Summer	1.311	0.0	3824
8640 min Summer	1.129	0.0	4496
10080 min Summer	0.994	0.0	5144
15 min Winter	138.153	0.0	18
30 min Winter	90.705	0.0	33

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 4B.SRCX

Designed by RSM
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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Winter	1.314	0.314	0.1	2.7	O K
120 min Winter	1.362	0.362	0.1	3.1	O K
180 min Winter	1.381	0.381	0.1	3.3	O K
240 min Winter	1.389	0.389	0.1	3.3	O K
360 min Winter	1.389	0.389	0.1	3.3	O K
480 min Winter	1.381	0.381	0.1	3.3	O K
600 min Winter	1.373	0.373	0.1	3.2	O K
720 min Winter	1.365	0.365	0.1	3.1	O K
960 min Winter	1.345	0.345	0.1	2.9	O K
1440 min Winter	1.303	0.303	0.1	2.6	O K
2160 min Winter	1.244	0.244	0.1	2.1	O K
2880 min Winter	1.194	0.194	0.1	1.7	O K
4320 min Winter	1.117	0.117	0.1	1.0	O K
5760 min Winter	1.065	0.065	0.0	0.6	O K
7200 min Winter	1.047	0.047	0.0	0.4	O K
8640 min Winter	1.041	0.041	0.0	0.3	O K
10080 min Winter	1.036	0.036	0.0	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	178
240 min Winter	20.078	0.0	234
360 min Winter	14.585	0.0	344
480 min Winter	11.622	0.0	438
600 min Winter	9.738	0.0	472
720 min Winter	8.424	0.0	548
960 min Winter	6.697	0.0	702
1440 min Winter	4.839	0.0	998
2160 min Winter	3.490	0.0	1428
2880 min Winter	2.766	0.0	1820
4320 min Winter	1.989	0.0	2552
5760 min Winter	1.573	0.0	3176
7200 min Winter	1.311	0.0	3744
8640 min Winter	1.129	0.0	4480
10080 min Winter	0.994	0.0	5144

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 4B.SRCX

Designed by RSM
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Causeway

Source Control 2020.1.3

Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.006

Time (mins) Area
From: To: (ha)

0 4 0.006

BLI Consulting		Page 28
Norwich Norfolk .	Residential Development Garden House Lane Rickingham, Suffolk	
Date 11/02/2022 File M100+CC_SOAKAWAY_PLOT 4B.SRCX	Designed by RSM Checked by RSM	

Causeway Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.400

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
 Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	9.0	9.0	0.400	9.0	14.2	0.500	0.0	14.2

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 5A.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 709 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.315	0.315	0.1	5.1	O K
30 min Summer	1.410	0.410	0.1	6.6	O K
60 min Summer	1.503	0.503	0.1	8.1	O K
120 min Summer	1.587	0.587	0.1	9.5	O K
180 min Summer	1.626	0.626	0.2	10.1	O K
240 min Summer	1.645	0.645	0.2	10.4	O K
360 min Summer	1.660	0.660	0.2	10.7	O K
480 min Summer	1.659	0.659	0.2	10.6	O K
600 min Summer	1.653	0.653	0.2	10.5	O K
720 min Summer	1.646	0.646	0.2	10.4	O K
960 min Summer	1.629	0.629	0.2	10.2	O K
1440 min Summer	1.593	0.593	0.1	9.6	O K
2160 min Summer	1.541	0.541	0.1	8.7	O K
2880 min Summer	1.494	0.494	0.1	8.0	O K
4320 min Summer	1.412	0.412	0.1	6.7	O K
5760 min Summer	1.343	0.343	0.1	5.5	O K
7200 min Summer	1.284	0.284	0.1	4.6	O K
8640 min Summer	1.234	0.234	0.1	3.8	O K
10080 min Summer	1.192	0.192	0.1	3.1	O K
15 min Winter	1.353	0.353	0.1	5.7	O K
30 min Winter	1.460	0.460	0.1	7.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	360
480 min Summer	11.622	0.0	478
600 min Summer	9.738	0.0	526
720 min Summer	8.424	0.0	590
960 min Summer	6.697	0.0	712
1440 min Summer	4.839	0.0	982
2160 min Summer	3.490	0.0	1404
2880 min Summer	2.766	0.0	1816
4320 min Summer	1.989	0.0	2596
5760 min Summer	1.573	0.0	3392
7200 min Summer	1.311	0.0	4112
8640 min Summer	1.129	0.0	4848
10080 min Summer	0.994	0.0	5552
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

Norwich

Residential Development

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Garden House Lane

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Rickingham, Suffolk

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.566	0.566	0.1	9.1	O K
120 min Winter	1.663	0.663	0.2	10.7	O K
180 min Winter	1.708	0.708	0.2	11.4	O K
240 min Winter	1.732	0.732	0.2	11.8	O K
360 min Winter	1.754	0.754	0.2	12.2	O K
480 min Winter	1.759	0.759	0.2	12.3	O K
600 min Winter	1.754	0.754	0.2	12.2	O K
720 min Winter	1.744	0.744	0.2	12.0	O K
960 min Winter	1.723	0.723	0.2	11.7	O K
1440 min Winter	1.677	0.677	0.2	10.9	O K
2160 min Winter	1.604	0.604	0.1	9.8	O K
2880 min Winter	1.536	0.536	0.1	8.6	O K
4320 min Winter	1.418	0.418	0.1	6.7	O K
5760 min Winter	1.321	0.321	0.1	5.2	O K
7200 min Winter	1.242	0.242	0.1	3.9	O K
8640 min Winter	1.177	0.177	0.1	2.9	O K
10080 min Winter	1.125	0.125	0.1	2.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	236
360 min Winter	14.585	0.0	350
480 min Winter	11.622	0.0	462
600 min Winter	9.738	0.0	568
720 min Winter	8.424	0.0	666
960 min Winter	6.697	0.0	752
1440 min Winter	4.839	0.0	1056
2160 min Winter	3.490	0.0	1512
2880 min Winter	2.766	0.0	1956
4320 min Winter	1.989	0.0	2768
5760 min Winter	1.573	0.0	3576
7200 min Winter	1.311	0.0	4328
8640 min Winter	1.129	0.0	5024
10080 min Winter	0.994	0.0	5744

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Residential Development
Garden House Lane
Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.020

Time (mins) Area
From: To: (ha)

0 4 0.020

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Residential Development
Garden House Lane
Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	17.0	17.0	0.800	17.0	33.8	0.900	0.0	33.8

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Residential Development

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 444 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.177	0.177	0.1	1.5	O K
30 min Summer	1.229	0.229	0.1	2.0	O K
60 min Summer	1.279	0.279	0.1	2.4	O K
120 min Summer	1.320	0.320	0.1	2.7	O K
180 min Summer	1.335	0.335	0.1	2.9	O K
240 min Summer	1.340	0.340	0.1	2.9	O K
360 min Summer	1.337	0.337	0.1	2.9	O K
480 min Summer	1.332	0.332	0.1	2.8	O K
600 min Summer	1.326	0.326	0.1	2.8	O K
720 min Summer	1.319	0.319	0.1	2.7	O K
960 min Summer	1.304	0.304	0.1	2.6	O K
1440 min Summer	1.275	0.275	0.1	2.4	O K
2160 min Summer	1.236	0.236	0.1	2.0	O K
2880 min Summer	1.201	0.201	0.1	1.7	O K
4320 min Summer	1.145	0.145	0.1	1.2	O K
5760 min Summer	1.103	0.103	0.1	0.9	O K
7200 min Summer	1.074	0.074	0.1	0.6	O K
8640 min Summer	1.056	0.056	0.0	0.5	O K
10080 min Summer	1.048	0.048	0.0	0.4	O K
15 min Winter	1.198	0.198	0.1	1.7	O K
30 min Winter	1.257	0.257	0.1	2.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	33
60 min Summer	56.713	0.0	62
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	240
360 min Summer	14.585	0.0	324
480 min Summer	11.622	0.0	382
600 min Summer	9.738	0.0	446
720 min Summer	8.424	0.0	512
960 min Summer	6.697	0.0	648
1440 min Summer	4.839	0.0	924
2160 min Summer	3.490	0.0	1320
2880 min Summer	2.766	0.0	1728
4320 min Summer	1.989	0.0	2464
5760 min Summer	1.573	0.0	3168
7200 min Summer	1.311	0.0	3824
8640 min Summer	1.129	0.0	4496
10080 min Summer	0.994	0.0	5144
15 min Winter	138.153	0.0	18
30 min Winter	90.705	0.0	33

Norwich

Residential Development

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.314	0.314	0.1	2.7	O K
120 min Winter	1.362	0.362	0.1	3.1	O K
180 min Winter	1.381	0.381	0.1	3.3	O K
240 min Winter	1.389	0.389	0.1	3.3	O K
360 min Winter	1.389	0.389	0.1	3.3	O K
480 min Winter	1.381	0.381	0.1	3.3	O K
600 min Winter	1.373	0.373	0.1	3.2	O K
720 min Winter	1.365	0.365	0.1	3.1	O K
960 min Winter	1.345	0.345	0.1	2.9	O K
1440 min Winter	1.303	0.303	0.1	2.6	O K
2160 min Winter	1.244	0.244	0.1	2.1	O K
2880 min Winter	1.194	0.194	0.1	1.7	O K
4320 min Winter	1.117	0.117	0.1	1.0	O K
5760 min Winter	1.065	0.065	0.0	0.6	O K
7200 min Winter	1.047	0.047	0.0	0.4	O K
8640 min Winter	1.041	0.041	0.0	0.3	O K
10080 min Winter	1.036	0.036	0.0	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	178
240 min Winter	20.078	0.0	234
360 min Winter	14.585	0.0	344
480 min Winter	11.622	0.0	438
600 min Winter	9.738	0.0	472
720 min Winter	8.424	0.0	548
960 min Winter	6.697	0.0	702
1440 min Winter	4.839	0.0	998
2160 min Winter	3.490	0.0	1428
2880 min Winter	2.766	0.0	1820
4320 min Winter	1.989	0.0	2552
5760 min Winter	1.573	0.0	3176
7200 min Winter	1.311	0.0	3744
8640 min Winter	1.129	0.0	4480
10080 min Winter	0.994	0.0	5144

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Residential Development
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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.006

Time (mins) Area
From: To: (ha)

0 4 0.006

Norwich
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Garden House Lane
Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.400

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	9.0	9.0	0.400	9.0	14.2	0.500	0.0	14.2

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 781 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	1.322	0.322	0.1	6.1	O K
30 min Summer	1.419	0.419	0.1	8.0	O K
60 min Summer	1.514	0.514	0.2	9.8	O K
120 min Summer	1.602	0.602	0.2	11.4	O K
180 min Summer	1.643	0.643	0.2	12.2	O K
240 min Summer	1.664	0.664	0.2	12.6	O K
360 min Summer	1.682	0.682	0.2	13.0	O K
480 min Summer	1.684	0.684	0.2	13.0	O K
600 min Summer	1.678	0.678	0.2	12.9	O K
720 min Summer	1.671	0.671	0.2	12.7	O K
960 min Summer	1.655	0.655	0.2	12.4	O K
1440 min Summer	1.619	0.619	0.2	11.8	O K
2160 min Summer	1.568	0.568	0.2	10.8	O K
2880 min Summer	1.521	0.521	0.2	9.9	O K
4320 min Summer	1.438	0.438	0.1	8.3	O K
5760 min Summer	1.367	0.367	0.1	7.0	O K
7200 min Summer	1.306	0.306	0.1	5.8	O K
8640 min Summer	1.254	0.254	0.1	4.8	O K
10080 min Summer	1.210	0.210	0.1	4.0	O K
15 min Winter	1.361	0.361	0.1	6.9	O K
30 min Winter	1.470	0.470	0.2	8.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	362
480 min Summer	11.622	0.0	480
600 min Summer	9.738	0.0	560
720 min Summer	8.424	0.0	612
960 min Summer	6.697	0.0	738
1440 min Summer	4.839	0.0	996
2160 min Summer	3.490	0.0	1408
2880 min Summer	2.766	0.0	1820
4320 min Summer	1.989	0.0	2636
5760 min Summer	1.573	0.0	3400
7200 min Summer	1.311	0.0	4176
8640 min Summer	1.129	0.0	4920
10080 min Summer	0.994	0.0	5640
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.578	0.578	0.2	11.0	O K
120 min Winter	1.679	0.679	0.2	12.9	O K
180 min Winter	1.727	0.727	0.2	13.8	O K
240 min Winter	1.753	0.753	0.2	14.3	O K
360 min Winter	1.779	0.779	0.2	14.8	O K
480 min Winter	1.787	0.787	0.2	14.9	O K
600 min Winter	1.784	0.784	0.2	14.9	O K
720 min Winter	1.776	0.776	0.2	14.7	O K
960 min Winter	1.754	0.754	0.2	14.3	O K
1440 min Winter	1.710	0.710	0.2	13.5	O K
2160 min Winter	1.638	0.638	0.2	12.1	O K
2880 min Winter	1.570	0.570	0.2	10.8	O K
4320 min Winter	1.450	0.450	0.1	8.6	O K
5760 min Winter	1.350	0.350	0.1	6.7	O K
7200 min Winter	1.267	0.267	0.1	5.1	O K
8640 min Winter	1.198	0.198	0.1	3.8	O K
10080 min Winter	1.141	0.141	0.1	2.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	238
360 min Winter	14.585	0.0	352
480 min Winter	11.622	0.0	464
600 min Winter	9.738	0.0	572
720 min Winter	8.424	0.0	676
960 min Winter	6.697	0.0	770
1440 min Winter	4.839	0.0	1070
2160 min Winter	3.490	0.0	1532
2880 min Winter	2.766	0.0	1964
4320 min Winter	1.989	0.0	2812
5760 min Winter	1.573	0.0	3624
7200 min Winter	1.311	0.0	4392
8640 min Winter	1.129	0.0	5104
10080 min Winter	0.994	0.0	5752

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Residential Development
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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.024

Time (mins) Area
From: To: (ha)

0 4 0.024

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Residential Development
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Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	20.0	20.0	0.800	20.0	36.8	0.900	0.0	36.8

Causeway Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 781 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.322	0.322	0.1	6.1	O K
30 min Summer	1.419	0.419	0.1	8.0	O K
60 min Summer	1.514	0.514	0.2	9.8	O K
120 min Summer	1.602	0.602	0.2	11.4	O K
180 min Summer	1.643	0.643	0.2	12.2	O K
240 min Summer	1.664	0.664	0.2	12.6	O K
360 min Summer	1.682	0.682	0.2	13.0	O K
480 min Summer	1.684	0.684	0.2	13.0	O K
600 min Summer	1.678	0.678	0.2	12.9	O K
720 min Summer	1.671	0.671	0.2	12.7	O K
960 min Summer	1.655	0.655	0.2	12.4	O K
1440 min Summer	1.619	0.619	0.2	11.8	O K
2160 min Summer	1.568	0.568	0.2	10.8	O K
2880 min Summer	1.521	0.521	0.2	9.9	O K
4320 min Summer	1.438	0.438	0.1	8.3	O K
5760 min Summer	1.367	0.367	0.1	7.0	O K
7200 min Summer	1.306	0.306	0.1	5.8	O K
8640 min Summer	1.254	0.254	0.1	4.8	O K
10080 min Summer	1.210	0.210	0.1	4.0	O K
15 min Winter	1.361	0.361	0.1	6.9	O K
30 min Winter	1.470	0.470	0.2	8.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	362
480 min Summer	11.622	0.0	480
600 min Summer	9.738	0.0	560
720 min Summer	8.424	0.0	612
960 min Summer	6.697	0.0	738
1440 min Summer	4.839	0.0	996
2160 min Summer	3.490	0.0	1408
2880 min Summer	2.766	0.0	1820
4320 min Summer	1.989	0.0	2636
5760 min Summer	1.573	0.0	3400
7200 min Summer	1.311	0.0	4176
8640 min Summer	1.129	0.0	4920
10080 min Summer	0.994	0.0	5640
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

Norwich

Residential Development

Norfolk

Garden House Lane

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Rickingham, Suffolk

Date 11/02/2022

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File M100+CC_SOAKAWAY_PLOT 7.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.578	0.578	0.2	11.0	O K
120 min Winter	1.679	0.679	0.2	12.9	O K
180 min Winter	1.727	0.727	0.2	13.8	O K
240 min Winter	1.753	0.753	0.2	14.3	O K
360 min Winter	1.779	0.779	0.2	14.8	O K
480 min Winter	1.787	0.787	0.2	14.9	O K
600 min Winter	1.784	0.784	0.2	14.9	O K
720 min Winter	1.776	0.776	0.2	14.7	O K
960 min Winter	1.754	0.754	0.2	14.3	O K
1440 min Winter	1.710	0.710	0.2	13.5	O K
2160 min Winter	1.638	0.638	0.2	12.1	O K
2880 min Winter	1.570	0.570	0.2	10.8	O K
4320 min Winter	1.450	0.450	0.1	8.6	O K
5760 min Winter	1.350	0.350	0.1	6.7	O K
7200 min Winter	1.267	0.267	0.1	5.1	O K
8640 min Winter	1.198	0.198	0.1	3.8	O K
10080 min Winter	1.141	0.141	0.1	2.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	238
360 min Winter	14.585	0.0	352
480 min Winter	11.622	0.0	464
600 min Winter	9.738	0.0	572
720 min Winter	8.424	0.0	676
960 min Winter	6.697	0.0	770
1440 min Winter	4.839	0.0	1070
2160 min Winter	3.490	0.0	1532
2880 min Winter	2.766	0.0	1964
4320 min Winter	1.989	0.0	2812
5760 min Winter	1.573	0.0	3624
7200 min Winter	1.311	0.0	4392
8640 min Winter	1.129	0.0	5104
10080 min Winter	0.994	0.0	5752

Norwich
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Residential Development
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Date 11/02/2022
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Causeway Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.024

Time (mins) Area
From: To: (ha)

0 4 0.024

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	20.0	20.0	0.800	20.0	36.8	0.900	0.0	36.8

Norwich

Residential Development

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Garden House Lane

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Rickingham, Suffolk

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 709 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.318	0.318	0.1	4.8	O K
30 min Summer	1.414	0.414	0.1	6.3	O K
60 min Summer	1.508	0.508	0.1	7.7	O K
120 min Summer	1.593	0.593	0.1	9.0	O K
180 min Summer	1.632	0.632	0.1	9.6	O K
240 min Summer	1.652	0.652	0.1	9.9	O K
360 min Summer	1.667	0.667	0.1	10.1	O K
480 min Summer	1.666	0.666	0.1	10.1	O K
600 min Summer	1.659	0.659	0.1	10.0	O K
720 min Summer	1.652	0.652	0.1	9.9	O K
960 min Summer	1.636	0.636	0.1	9.7	O K
1440 min Summer	1.600	0.600	0.1	9.1	O K
2160 min Summer	1.547	0.547	0.1	8.3	O K
2880 min Summer	1.500	0.500	0.1	7.6	O K
4320 min Summer	1.417	0.417	0.1	6.3	O K
5760 min Summer	1.348	0.348	0.1	5.3	O K
7200 min Summer	1.289	0.289	0.1	4.4	O K
8640 min Summer	1.239	0.239	0.1	3.6	O K
10080 min Summer	1.196	0.196	0.1	3.0	O K
15 min Winter	1.357	0.357	0.1	5.4	O K
30 min Winter	1.464	0.464	0.1	7.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	360
480 min Summer	11.622	0.0	478
600 min Summer	9.738	0.0	524
720 min Summer	8.424	0.0	588
960 min Summer	6.697	0.0	712
1440 min Summer	4.839	0.0	982
2160 min Summer	3.490	0.0	1404
2880 min Summer	2.766	0.0	1816
4320 min Summer	1.989	0.0	2596
5760 min Summer	1.573	0.0	3392
7200 min Summer	1.311	0.0	4112
8640 min Summer	1.129	0.0	4848
10080 min Summer	0.994	0.0	5552
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

Norwich

Residential Development

Norfolk

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Rickingham, Suffolk

Date 11/02/2022

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.571	0.571	0.1	8.7	O K
120 min Winter	1.669	0.669	0.1	10.2	O K
180 min Winter	1.715	0.715	0.2	10.9	O K
240 min Winter	1.739	0.739	0.2	11.2	O K
360 min Winter	1.762	0.762	0.2	11.6	O K
480 min Winter	1.766	0.766	0.2	11.7	O K
600 min Winter	1.761	0.761	0.2	11.6	O K
720 min Winter	1.751	0.751	0.2	11.4	O K
960 min Winter	1.731	0.731	0.2	11.1	O K
1440 min Winter	1.684	0.684	0.2	10.4	O K
2160 min Winter	1.611	0.611	0.1	9.3	O K
2880 min Winter	1.542	0.542	0.1	8.2	O K
4320 min Winter	1.423	0.423	0.1	6.4	O K
5760 min Winter	1.326	0.326	0.1	5.0	O K
7200 min Winter	1.247	0.247	0.1	3.8	O K
8640 min Winter	1.182	0.182	0.1	2.8	O K
10080 min Winter	1.129	0.129	0.1	2.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	236
360 min Winter	14.585	0.0	350
480 min Winter	11.622	0.0	462
600 min Winter	9.738	0.0	568
720 min Winter	8.424	0.0	664
960 min Winter	6.697	0.0	750
1440 min Winter	4.839	0.0	1056
2160 min Winter	3.490	0.0	1512
2880 min Winter	2.766	0.0	1956
4320 min Winter	1.989	0.0	2768
5760 min Winter	1.573	0.0	3576
7200 min Winter	1.311	0.0	4328
8640 min Winter	1.129	0.0	5024
10080 min Winter	0.994	0.0	5744

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.019

Time (mins) Area
From: To: (ha)

0 4 0.019

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	16.0	16.0	0.800	16.0	32.0	0.900	0.0	32.0

Norwich

Residential Development

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Garden House Lane

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Rickingham, Suffolk

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 444 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.177	0.177	0.1	1.5	O K
30 min Summer	1.229	0.229	0.1	2.0	O K
60 min Summer	1.279	0.279	0.1	2.4	O K
120 min Summer	1.320	0.320	0.1	2.7	O K
180 min Summer	1.335	0.335	0.1	2.9	O K
240 min Summer	1.340	0.340	0.1	2.9	O K
360 min Summer	1.337	0.337	0.1	2.9	O K
480 min Summer	1.332	0.332	0.1	2.8	O K
600 min Summer	1.326	0.326	0.1	2.8	O K
720 min Summer	1.319	0.319	0.1	2.7	O K
960 min Summer	1.304	0.304	0.1	2.6	O K
1440 min Summer	1.275	0.275	0.1	2.4	O K
2160 min Summer	1.236	0.236	0.1	2.0	O K
2880 min Summer	1.201	0.201	0.1	1.7	O K
4320 min Summer	1.145	0.145	0.1	1.2	O K
5760 min Summer	1.103	0.103	0.1	0.9	O K
7200 min Summer	1.074	0.074	0.1	0.6	O K
8640 min Summer	1.056	0.056	0.0	0.5	O K
10080 min Summer	1.048	0.048	0.0	0.4	O K
15 min Winter	1.198	0.198	0.1	1.7	O K
30 min Winter	1.257	0.257	0.1	2.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	33
60 min Summer	56.713	0.0	62
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	240
360 min Summer	14.585	0.0	324
480 min Summer	11.622	0.0	382
600 min Summer	9.738	0.0	446
720 min Summer	8.424	0.0	512
960 min Summer	6.697	0.0	648
1440 min Summer	4.839	0.0	924
2160 min Summer	3.490	0.0	1320
2880 min Summer	2.766	0.0	1728
4320 min Summer	1.989	0.0	2464
5760 min Summer	1.573	0.0	3168
7200 min Summer	1.311	0.0	3824
8640 min Summer	1.129	0.0	4496
10080 min Summer	0.994	0.0	5144
15 min Winter	138.153	0.0	18
30 min Winter	90.705	0.0	33

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 8B.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Winter	1.314	0.314	0.1	2.7	O K
120 min Winter	1.362	0.362	0.1	3.1	O K
180 min Winter	1.381	0.381	0.1	3.3	O K
240 min Winter	1.389	0.389	0.1	3.3	O K
360 min Winter	1.389	0.389	0.1	3.3	O K
480 min Winter	1.381	0.381	0.1	3.3	O K
600 min Winter	1.373	0.373	0.1	3.2	O K
720 min Winter	1.365	0.365	0.1	3.1	O K
960 min Winter	1.345	0.345	0.1	2.9	O K
1440 min Winter	1.303	0.303	0.1	2.6	O K
2160 min Winter	1.244	0.244	0.1	2.1	O K
2880 min Winter	1.194	0.194	0.1	1.7	O K
4320 min Winter	1.117	0.117	0.1	1.0	O K
5760 min Winter	1.065	0.065	0.0	0.6	O K
7200 min Winter	1.047	0.047	0.0	0.4	O K
8640 min Winter	1.041	0.041	0.0	0.3	O K
10080 min Winter	1.036	0.036	0.0	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	178
240 min Winter	20.078	0.0	234
360 min Winter	14.585	0.0	344
480 min Winter	11.622	0.0	438
600 min Winter	9.738	0.0	472
720 min Winter	8.424	0.0	548
960 min Winter	6.697	0.0	702
1440 min Winter	4.839	0.0	998
2160 min Winter	3.490	0.0	1428
2880 min Winter	2.766	0.0	1820
4320 min Winter	1.989	0.0	2552
5760 min Winter	1.573	0.0	3176
7200 min Winter	1.311	0.0	3744
8640 min Winter	1.129	0.0	4480
10080 min Winter	0.994	0.0	5144

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.006

Time (mins) Area
From: To: (ha)

0 4 0.006

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Residential Development
Garden House Lane
Rickingham, Suffolk



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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.400

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	9.0	9.0	0.400	9.0	14.2	0.500	0.0	14.2

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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 611 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	1.306	0.306	0.1	3.0	O K
30 min Summer	1.397	0.397	0.1	4.0	O K
60 min Summer	1.486	0.486	0.1	4.9	O K
120 min Summer	1.565	0.565	0.1	5.6	O K
180 min Summer	1.600	0.600	0.1	6.0	O K
240 min Summer	1.616	0.616	0.1	6.1	O K
360 min Summer	1.625	0.625	0.1	6.2	O K
480 min Summer	1.621	0.621	0.1	6.2	O K
600 min Summer	1.614	0.614	0.1	6.1	O K
720 min Summer	1.607	0.607	0.1	6.1	O K
960 min Summer	1.590	0.590	0.1	5.9	O K
1440 min Summer	1.553	0.553	0.1	5.5	O K
2160 min Summer	1.500	0.500	0.1	5.0	O K
2880 min Summer	1.453	0.453	0.1	4.5	O K
4320 min Summer	1.372	0.372	0.1	3.7	O K
5760 min Summer	1.306	0.306	0.1	3.0	O K
7200 min Summer	1.250	0.250	0.1	2.5	O K
8640 min Summer	1.204	0.204	0.1	2.0	O K
10080 min Summer	1.166	0.166	0.1	1.7	O K
15 min Winter	1.343	0.343	0.1	3.4	O K
30 min Winter	1.446	0.446	0.1	4.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	360
480 min Summer	11.622	0.0	438
600 min Summer	9.738	0.0	494
720 min Summer	8.424	0.0	556
960 min Summer	6.697	0.0	684
1440 min Summer	4.839	0.0	964
2160 min Summer	3.490	0.0	1368
2880 min Summer	2.766	0.0	1784
4320 min Summer	1.989	0.0	2556
5760 min Summer	1.573	0.0	3344
7200 min Summer	1.311	0.0	4104
8640 min Summer	1.129	0.0	4760
10080 min Summer	0.994	0.0	5544
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

Norwich

Residential Development

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Rickingham, Suffolk

Date 11/02/2022

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.547	0.547	0.1	5.5	O K
120 min Winter	1.638	0.638	0.1	6.4	O K
180 min Winter	1.680	0.680	0.1	6.8	O K
240 min Winter	1.700	0.700	0.1	7.0	O K
360 min Winter	1.716	0.716	0.1	7.1	O K
480 min Winter	1.715	0.715	0.1	7.1	O K
600 min Winter	1.706	0.706	0.1	7.0	O K
720 min Winter	1.695	0.695	0.1	6.9	O K
960 min Winter	1.675	0.675	0.1	6.7	O K
1440 min Winter	1.625	0.625	0.1	6.2	O K
2160 min Winter	1.549	0.549	0.1	5.5	O K
2880 min Winter	1.481	0.481	0.1	4.8	O K
4320 min Winter	1.367	0.367	0.1	3.7	O K
5760 min Winter	1.277	0.277	0.1	2.8	O K
7200 min Winter	1.205	0.205	0.1	2.0	O K
8640 min Winter	1.147	0.147	0.1	1.5	O K
10080 min Winter	1.101	0.101	0.1	1.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	178
240 min Winter	20.078	0.0	236
360 min Winter	14.585	0.0	348
480 min Winter	11.622	0.0	458
600 min Winter	9.738	0.0	556
720 min Winter	8.424	0.0	578
960 min Winter	6.697	0.0	730
1440 min Winter	4.839	0.0	1038
2160 min Winter	3.490	0.0	1488
2880 min Winter	2.766	0.0	1904
4320 min Winter	1.989	0.0	2724
5760 min Winter	1.573	0.0	3512
7200 min Winter	1.311	0.0	4256
8640 min Winter	1.129	0.0	4936
10080 min Winter	0.994	0.0	5648

Norwich
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Residential Development
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 Rickingham, Suffolk



Date 11/02/2022
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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.012

Time (mins) Area
From: To: (ha)

0 4 0.012

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 9.SRCX

Designed by RSM
Checked by RSM

Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	10.5	10.5	0.800	10.5	24.1	0.900	0.0	24.1

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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 10.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 671 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.321	0.321	0.1	3.1	O K
30 min Summer	1.418	0.418	0.1	4.0	O K
60 min Summer	1.513	0.513	0.1	4.9	O K
120 min Summer	1.598	0.598	0.1	5.7	O K
180 min Summer	1.636	0.636	0.1	6.0	O K
240 min Summer	1.655	0.655	0.1	6.2	O K
360 min Summer	1.669	0.669	0.1	6.4	O K
480 min Summer	1.667	0.667	0.1	6.3	O K
600 min Summer	1.660	0.660	0.1	6.3	O K
720 min Summer	1.653	0.653	0.1	6.2	O K
960 min Summer	1.636	0.636	0.1	6.0	O K
1440 min Summer	1.599	0.599	0.1	5.7	O K
2160 min Summer	1.546	0.546	0.1	5.2	O K
2880 min Summer	1.498	0.498	0.1	4.7	O K
4320 min Summer	1.415	0.415	0.1	3.9	O K
5760 min Summer	1.345	0.345	0.1	3.3	O K
7200 min Summer	1.287	0.287	0.1	2.7	O K
8640 min Summer	1.237	0.237	0.1	2.3	O K
10080 min Summer	1.195	0.195	0.1	1.9	O K
15 min Winter	1.360	0.360	0.1	3.4	O K
30 min Winter	1.469	0.469	0.1	4.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	19
30 min Summer	90.705	0.0	34
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	360
480 min Summer	11.622	0.0	468
600 min Summer	9.738	0.0	516
720 min Summer	8.424	0.0	576
960 min Summer	6.697	0.0	702
1440 min Summer	4.839	0.0	980
2160 min Summer	3.490	0.0	1388
2880 min Summer	2.766	0.0	1792
4320 min Summer	1.989	0.0	2596
5760 min Summer	1.573	0.0	3352
7200 min Summer	1.311	0.0	4112
8640 min Summer	1.129	0.0	4840
10080 min Summer	0.994	0.0	5552
15 min Winter	138.153	0.0	19
30 min Winter	90.705	0.0	33

Norwich

Residential Development

Norfolk

Garden House Lane

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Rickingham, Suffolk

Date 11/02/2022

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File M100+CC_SOAKAWAY_PLOT 10.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.577	0.577	0.1	5.5	O K
120 min Winter	1.674	0.674	0.1	6.4	O K
180 min Winter	1.720	0.720	0.1	6.8	O K
240 min Winter	1.744	0.744	0.1	7.1	O K
360 min Winter	1.764	0.764	0.1	7.3	O K
480 min Winter	1.768	0.768	0.1	7.3	O K
600 min Winter	1.761	0.761	0.1	7.2	O K
720 min Winter	1.750	0.750	0.1	7.1	O K
960 min Winter	1.730	0.730	0.1	6.9	O K
1440 min Winter	1.682	0.682	0.1	6.5	O K
2160 min Winter	1.606	0.606	0.1	5.8	O K
2880 min Winter	1.537	0.537	0.1	5.1	O K
4320 min Winter	1.418	0.418	0.1	4.0	O K
5760 min Winter	1.322	0.322	0.1	3.1	O K
7200 min Winter	1.244	0.244	0.1	2.3	O K
8640 min Winter	1.180	0.180	0.1	1.7	O K
10080 min Winter	1.128	0.128	0.1	1.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	62
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	178
240 min Winter	20.078	0.0	236
360 min Winter	14.585	0.0	350
480 min Winter	11.622	0.0	460
600 min Winter	9.738	0.0	566
720 min Winter	8.424	0.0	652
960 min Winter	6.697	0.0	742
1440 min Winter	4.839	0.0	1052
2160 min Winter	3.490	0.0	1496
2880 min Winter	2.766	0.0	1932
4320 min Winter	1.989	0.0	2768
5760 min Winter	1.573	0.0	3568
7200 min Winter	1.311	0.0	4320
8640 min Winter	1.129	0.0	5016
10080 min Winter	0.994	0.0	5744

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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 10.SRCX

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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.012

Time (mins) Area
From: To: (ha)

0 4 0.012

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 11/02/2022
File M100+CC_SOAKAWAY_PLOT 10.SRCX

Designed by RSM
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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.800

Cellular Storage Structure

Invert Level (m) 1.000 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.05458 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.05458

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	10.0	10.0	0.800	10.0	21.2	0.900	0.0	21.2

Norwich

Residential Development

Norfolk

Garden House Lane

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Rickingham, Suffolk

Date 23/02/2022

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File M100+CC_PRIVATE ROAD.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 132 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	1.382	0.382	0.4	3.6	O K
30 min Summer	1.441	0.441	0.4	4.8	O K
60 min Summer	1.484	0.484	0.5	5.8	O K
120 min Summer	1.506	0.506	0.5	6.3	O K
180 min Summer	1.510	0.510	0.5	6.4	O K
240 min Summer	1.508	0.508	0.5	6.4	O K
360 min Summer	1.499	0.499	0.5	6.1	O K
480 min Summer	1.486	0.486	0.5	5.9	O K
600 min Summer	1.473	0.473	0.5	5.5	O K
720 min Summer	1.460	0.460	0.5	5.2	O K
960 min Summer	1.435	0.435	0.4	4.7	O K
1440 min Summer	1.390	0.390	0.4	3.8	O K
2160 min Summer	1.338	0.338	0.3	2.8	O K
2880 min Summer	1.298	0.298	0.3	2.2	O K
4320 min Summer	1.241	0.241	0.2	1.4	O K
5760 min Summer	1.202	0.202	0.2	1.0	O K
7200 min Summer	1.174	0.174	0.2	0.8	O K
8640 min Summer	1.153	0.153	0.2	0.6	O K
10080 min Summer	1.136	0.136	0.1	0.5	O K
15 min Winter	1.410	0.410	0.4	4.2	O K
30 min Winter	1.472	0.472	0.5	5.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	138.153	0.0	18
30 min Summer	90.705	0.0	32
60 min Summer	56.713	0.0	62
120 min Summer	34.246	0.0	104
180 min Summer	25.149	0.0	136
240 min Summer	20.078	0.0	168
360 min Summer	14.585	0.0	236
480 min Summer	11.622	0.0	306
600 min Summer	9.738	0.0	374
720 min Summer	8.424	0.0	440
960 min Summer	6.697	0.0	568
1440 min Summer	4.839	0.0	822
2160 min Summer	3.490	0.0	1188
2880 min Summer	2.766	0.0	1556
4320 min Summer	1.989	0.0	2252
5760 min Summer	1.573	0.0	2992
7200 min Summer	1.311	0.0	3680
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.994	0.0	5144
15 min Winter	138.153	0.0	18
30 min Winter	90.705	0.0	32

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 23/02/2022
File M100+CC_PRIVATE ROAD.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Winter	1.521	0.521	0.5	6.7	O K
120 min Winter	1.547	0.547	0.6	7.3	O K
180 min Winter	1.548	0.548	0.6	7.3	O K
240 min Winter	1.544	0.544	0.5	7.2	O K
360 min Winter	1.527	0.527	0.5	6.8	O K
480 min Winter	1.508	0.508	0.5	6.4	O K
600 min Winter	1.488	0.488	0.5	5.9	O K
720 min Winter	1.469	0.469	0.5	5.5	O K
960 min Winter	1.434	0.434	0.4	4.7	O K
1440 min Winter	1.374	0.374	0.4	3.5	O K
2160 min Winter	1.307	0.307	0.3	2.3	O K
2880 min Winter	1.259	0.259	0.3	1.7	O K
4320 min Winter	1.196	0.196	0.2	0.9	O K
5760 min Winter	1.157	0.157	0.2	0.6	O K
7200 min Winter	1.131	0.131	0.1	0.4	O K
8640 min Winter	1.113	0.113	0.1	0.3	O K
10080 min Winter	1.099	0.099	0.1	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Winter	56.713	0.0	60
120 min Winter	34.246	0.0	114
180 min Winter	25.149	0.0	142
240 min Winter	20.078	0.0	180
360 min Winter	14.585	0.0	256
480 min Winter	11.622	0.0	330
600 min Winter	9.738	0.0	400
720 min Winter	8.424	0.0	470
960 min Winter	6.697	0.0	604
1440 min Winter	4.839	0.0	854
2160 min Winter	3.490	0.0	1228
2880 min Winter	2.766	0.0	1584
4320 min Winter	1.989	0.0	2292
5760 min Winter	1.573	0.0	2992
7200 min Winter	1.311	0.0	3680
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.994	0.0	5144

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 23/02/2022
File M100+CC_PRIVATE ROAD.SRCX

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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.018

Time (mins) Area
From: To: (ha)

0 4 0.018

Norwich
Norfolk
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 23/02/2022

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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.630

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.06595	Width (m)	5.5
Membrane Percolation (mm/hr)	1000	Length (m)	30.0
Max Percolation (l/s)	45.8	Slope (1:X)	30.0
Safety Factor	3.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	1.000	Cap Volume Depth (m)	0.450

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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 23/02/2022
File M100+CC_Private Drive.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 101 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	1.277	0.277	0.7	4.5	O K
30 min Summer	1.318	0.318	0.8	6.0	O K
60 min Summer	1.347	0.347	0.8	7.0	O K
120 min Summer	1.359	0.359	0.9	7.5	O K
180 min Summer	1.360	0.360	0.9	7.5	O K
240 min Summer	1.356	0.356	0.9	7.3	O K
360 min Summer	1.343	0.343	0.8	6.9	O K
480 min Summer	1.329	0.329	0.8	6.4	O K
600 min Summer	1.316	0.316	0.8	5.9	O K
720 min Summer	1.304	0.304	0.7	5.4	O K
960 min Summer	1.282	0.282	0.7	4.7	O K
1440 min Summer	1.246	0.246	0.6	3.6	O K
2160 min Summer	1.207	0.207	0.5	2.5	O K
2880 min Summer	1.178	0.178	0.4	1.9	O K
4320 min Summer	1.139	0.139	0.3	1.1	O K
5760 min Summer	1.115	0.115	0.3	0.8	O K
7200 min Summer	1.098	0.098	0.2	0.6	O K
8640 min Summer	1.084	0.084	0.2	0.4	O K
10080 min Summer	1.074	0.074	0.2	0.3	O K
15 min Winter	1.297	0.297	0.7	5.2	O K
30 min Winter	1.342	0.342	0.8	6.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	138.153	0.0	18
30 min Summer	90.705	0.0	32
60 min Summer	56.713	0.0	60
120 min Summer	34.246	0.0	92
180 min Summer	25.149	0.0	126
240 min Summer	20.078	0.0	160
360 min Summer	14.585	0.0	228
480 min Summer	11.622	0.0	296
600 min Summer	9.738	0.0	362
720 min Summer	8.424	0.0	426
960 min Summer	6.697	0.0	550
1440 min Summer	4.839	0.0	794
2160 min Summer	3.490	0.0	1152
2880 min Summer	2.766	0.0	1524
4320 min Summer	1.989	0.0	2208
5760 min Summer	1.573	0.0	2944
7200 min Summer	1.311	0.0	3672
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.994	0.0	5136
15 min Winter	138.153	0.0	18
30 min Winter	90.705	0.0	32

Norwich

Residential Development

Norfolk

Garden House Lane

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Rickingham, Suffolk

Date 23/02/2022

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
60 min Winter	1.376	0.376	0.9	8.1	O K
120 min Winter	1.388	0.388	0.9	8.5	O K
180 min Winter	1.386	0.386	0.9	8.4	O K
240 min Winter	1.378	0.378	0.9	8.1	O K
360 min Winter	1.358	0.358	0.9	7.4	O K
480 min Winter	1.337	0.337	0.8	6.7	O K
600 min Winter	1.319	0.319	0.8	6.0	O K
720 min Winter	1.302	0.302	0.7	5.4	O K
960 min Winter	1.272	0.272	0.7	4.4	O K
1440 min Winter	1.226	0.226	0.5	3.0	O K
2160 min Winter	1.178	0.178	0.4	1.9	O K
2880 min Winter	1.146	0.146	0.4	1.3	O K
4320 min Winter	1.108	0.108	0.3	0.7	O K
5760 min Winter	1.085	0.085	0.2	0.4	O K
7200 min Winter	1.071	0.071	0.2	0.3	O K
8640 min Winter	1.061	0.061	0.1	0.2	O K
10080 min Winter	1.053	0.053	0.1	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	60
120 min Winter	34.246	0.0	96
180 min Winter	25.149	0.0	134
240 min Winter	20.078	0.0	172
360 min Winter	14.585	0.0	246
480 min Winter	11.622	0.0	316
600 min Winter	9.738	0.0	384
720 min Winter	8.424	0.0	448
960 min Winter	6.697	0.0	578
1440 min Winter	4.839	0.0	822
2160 min Winter	3.490	0.0	1188
2880 min Winter	2.766	0.0	1528
4320 min Winter	1.989	0.0	2244
5760 min Winter	1.573	0.0	2944
7200 min Winter	1.311	0.0	3672
8640 min Winter	1.129	0.0	4400
10080 min Winter	0.994	0.0	5128

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Residential Development
 Garden House Lane
 Rickingham, Suffolk



Date 23/02/2022
 File M100+CC_Private Drive.SRCX

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Causeway

Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.023

Time (mins) Area
From: To: (ha)

0 4 0.023

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 23/02/2022
File M100+CC_Private Drive.SRCX

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Causeway

Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 1.440

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.06595	Width (m)	13.1
Membrane Percolation (mm/hr)	1000	Length (m)	16.1
Max Percolation (l/s)	58.6	Slope (1:X)	30.0
Safety Factor	3.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	1.000	Cap Volume Depth (m)	0.300

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Rickingham, SuffolkDate 23/02/2022
File M100+CC_Private Patio.SRCXDesigned by RSM
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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 60 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	1.125	0.125	0.6	2.2	O K
30 min Summer	1.146	0.146	0.6	2.9	O K
60 min Summer	1.159	0.159	0.6	3.3	O K
120 min Summer	1.161	0.161	0.6	3.3	O K
180 min Summer	1.154	0.154	0.6	3.1	O K
240 min Summer	1.146	0.146	0.6	2.9	O K
360 min Summer	1.129	0.129	0.6	2.4	O K
480 min Summer	1.114	0.114	0.6	1.9	O K
600 min Summer	1.103	0.103	0.6	1.6	O K
720 min Summer	1.096	0.096	0.6	1.4	O K
960 min Summer	1.084	0.084	0.5	1.1	O K
1440 min Summer	1.068	0.068	0.4	0.7	O K
2160 min Summer	1.053	0.053	0.3	0.4	O K
2880 min Summer	1.047	0.047	0.3	0.3	O K
4320 min Summer	1.040	0.040	0.2	0.2	O K
5760 min Summer	1.035	0.035	0.2	0.2	O K
7200 min Summer	1.032	0.032	0.1	0.2	O K
8640 min Summer	1.030	0.030	0.1	0.1	O K
10080 min Summer	1.028	0.028	0.1	0.1	O K
15 min Winter	1.137	0.137	0.6	2.6	O K
30 min Winter	1.162	0.162	0.6	3.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	138.153	0.0	17
30 min Summer	90.705	0.0	31
60 min Summer	56.713	0.0	52
120 min Summer	34.246	0.0	84
180 min Summer	25.149	0.0	118
240 min Summer	20.078	0.0	152
360 min Summer	14.585	0.0	216
480 min Summer	11.622	0.0	278
600 min Summer	9.738	0.0	334
720 min Summer	8.424	0.0	392
960 min Summer	6.697	0.0	512
1440 min Summer	4.839	0.0	750
2160 min Summer	3.490	0.0	1104
2880 min Summer	2.766	0.0	1468
4320 min Summer	1.989	0.0	2196
5760 min Summer	1.573	0.0	2928
7200 min Summer	1.311	0.0	3656
8640 min Summer	1.129	0.0	4352
10080 min Summer	0.994	0.0	5064
15 min Winter	138.153	0.0	17
30 min Winter	90.705	0.0	31

Norwich
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Residential Development
Garden House Lane
Rickingham, Suffolk



Date 23/02/2022
File M100+CC_Private Patio.SRCX

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Causeway

Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Winter	1.180	0.180	0.6	3.8	O K
120 min Winter	1.179	0.179	0.6	3.8	O K
180 min Winter	1.166	0.166	0.6	3.5	O K
240 min Winter	1.152	0.152	0.6	3.1	O K
360 min Winter	1.126	0.126	0.6	2.3	O K
480 min Winter	1.106	0.106	0.6	1.7	O K
600 min Winter	1.094	0.094	0.6	1.3	O K
720 min Winter	1.085	0.085	0.5	1.1	O K
960 min Winter	1.072	0.072	0.4	0.8	O K
1440 min Winter	1.054	0.054	0.3	0.4	O K
2160 min Winter	1.045	0.045	0.2	0.3	O K
2880 min Winter	1.040	0.040	0.2	0.2	O K
4320 min Winter	1.034	0.034	0.1	0.2	O K
5760 min Winter	1.030	0.030	0.1	0.1	O K
7200 min Winter	1.027	0.027	0.1	0.1	O K
8640 min Winter	1.025	0.025	0.1	0.1	O K
10080 min Winter	1.024	0.024	0.1	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Winter	56.713	0.0	58
120 min Winter	34.246	0.0	92
180 min Winter	25.149	0.0	130
240 min Winter	20.078	0.0	164
360 min Winter	14.585	0.0	230
480 min Winter	11.622	0.0	288
600 min Winter	9.738	0.0	344
720 min Winter	8.424	0.0	404
960 min Winter	6.697	0.0	520
1440 min Winter	4.839	0.0	750
2160 min Winter	3.490	0.0	1092
2880 min Winter	2.766	0.0	1444
4320 min Winter	1.989	0.0	2188
5760 min Winter	1.573	0.0	2872
7200 min Winter	1.311	0.0	3544
8640 min Winter	1.129	0.0	4328
10080 min Winter	0.994	0.0	5056

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.012

Time (mins) Area
From: To: (ha)

0 4 0.012

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Residential Development
Garden House Lane
Rickingham, Suffolk



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Model Details

Storage is Online Cover Level (m) 1.240

Porous Car Park Structure


Infiltration Coefficient Base (m/hr)	0.06595	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	27.8	Slope (1:X)	100.0
Safety Factor	3.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	1.000	Cap Volume Depth (m)	0.150

Appendix J

Surface Water Calculations – Proposed Greenfield Discharge Rates & Volumes

Contents

Page 1	Greenfield Discharge Rates
Pages 2 – 4	Greenfield Discharge Volumes

BLI Consulting		Page 1
Norwich Norfolk .	Residential Development Land south of Gardenhouse Lane Rickingham, Suffolk	
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ICP SUDS Mean Annual Flood

Input

Return Period (years) 1 SAAR (mm) 600 Urban 0.000
Area (ha) 1.005 Soil 0.400 Region Number Region 5

Results 1/s

QBAR Rural 2.9
QBAR Urban 2.9

Q1 year 2.5

Q1 year 2.5
Q30 years 6.9
Q100 years 10.2

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Land south of Gardenhouse Lane
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Greenfield Runoff Volume

FSR Data

Return Period (years)	1
Storm Duration (mins)	360
Region England and Wales	
M5-60 (mm)	20.000
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	1.005
SAAR (mm)	600
CWI	87.000
Urban	0.000
SPR	37.000

Results

Percentage Runoff (%)	27.50
Greenfield Runoff Volume (m ³)	60.461

BLI Consulting		Page 3
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Greenfield Runoff Volume

FSR Data

Return Period (years)	30
Storm Duration (mins)	360
Region England and Wales	
M5-60 (mm)	20.000
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	1.005
SAAR (mm)	600
CWI	87.000
Urban	0.000
SPR	37.000

Results

Percentage Runoff (%)	29.46
Greenfield Runoff Volume (m ³)	142.744

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Norwich Norfolk .	Residential Development Land south of Gardenhouse Lane Rickingham, Suffolk	
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Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region England and Wales	
M5-60 (mm)	20.000
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	1.005
SAAR (mm)	600
CWI	87.000
Urban	0.000
SPR	37.000

Results

Percentage Runoff (%)	31.48
Greenfield Runoff Volume (m ³)	197.752