



Drainage Simulations for Surface Water
Revision 0

Job No. 29478

Proposed Mixed Use Development
Willisham Hall
Barking Road
Willisham
Suffolk
IP8 4SL

Client: Herin Property Investments LLP

February 2024

REPORT CONTROL SHEET

Client: Herin Property Investments LLP **Job No.:** 29478

Project Name: Proposed Mixed Use Development
 Willisham Hall
 Barking Road
 Willisham
 Suffolk
 IP8 4SL

Issue		
Revision 0	February 2024	Report Prepared by: Chloe Spencer M.Sc, AMIEnvSc Senior Environmental Consultant
		Report Reviewed & Authorised by: Matt Hare B.Sc, CEng, MCIWEM, C.WEM, MICE, MIMechE Director - Infrastructure

CONDITIONS OF INVESTIGATION & REPORTING

This report and its findings should be considered in relation to the terms of the brief and objectives agreed between PDC Engineering and the Client.

PDC Engineering are only able to work with information available at the time when the report is carried out which have been applied to the report in accordance with current best practice. PDC Engineering cannot be held responsible for any subsequent flooding to the development or surrounding area.

The details contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by PDC Engineering has not been independently verified by PDC Engineering, unless otherwise stated in the report.

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- Drawing No. 29478/010 - Drainage Details
- Drawing No. 29478/015 - Detention Basin Plan and Details

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APPENDIX B

Surface Water Maintenance Plan

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DESIGN COMMENTS

This Drainage Simulations for Surface Water (DSSW) was prepared by PDC Engineering. The report was commissioned by Hollins Architects and Surveyors on behalf of Herin Property Investments LLP.

This has been prepared to address Mid Suffolk District Council's Planning Condition 13 of Planning Application, Reference DC/20/02426, for the erection of eleven dwellings, five commercial B1 (office) space units, a A1/A3 farm shop/cafe, play area, footpath, and associated parking at Willisham Hall, Barking Road, Willisham, Suffolk, IP8 4SL, referred to here within as the site.

SURFACE WATER DRAINAGE DESIGN

Excavations were undertaken on-site by A F Howland Associates in February 2024. These confirmed the ground conditions of made ground and clay, are similar to that of the ground works undertaken by Create Consulting in May 2020 as part of the original planning application. Percolation testing was also undertaken by A F Howland Associates as part of the ground investigation, with the first test in all three excavations failing to drain within 24 hours, for further details refer to **Appendix C**.

The testing undertaken by Create Consulting encountered potential perched groundwater seepage 0.84m to 2.69m below ground level (bgl). The testing by A F Howland Associates also encountered groundwater seepage in SA01C at 1.5m bgl and in TP01 at 1.9m bgl, but did not encounter groundwater within the other excavations which ranged in depth from 0.65m to 3.00m bgl, for further details refer to **Appendix C**.

The above Ground Investigations concluded that the use of infiltration drainage as a primary drainage solution is not suitable for this site due to the poor porosity rate and groundwater levels observed.

Clay soils, due to their low porosity, have a high capacity to hold water. This becomes advantageous during periods of low rainfall or drought as it provides a source of water to the root systems of plants and crops, supporting their growth and survival.

The drainage system has been designed to contain up to and including the 1 in 100 year rainfall event including the effects of climate change (45%), refer to **Appendix A** for the Info Drainage design simulations and Drawing No. 29478/805 in the **Drawings Appendix** for the location, dimensions, and design of the drainage features.

The surface water runoff from the proposed hardstanding will discharge into a detention/attenuation basin located in the south-west of the site. The basin will attenuate the flow prior to the water outfalling into the ditch to the south-west of the site at a controlled rate via a flow control, refer to Drawing No. 29478/805 in the **Drawings Appendix**.

The detention/attenuation basin will be 1.3m deep with bank slopes of 1 in 4 and a 1.5m wet bench located 0.6m from the base. It will also include a gabion permeable berm, that will create a sediment forebay, and enable flows to pass through, as well as a low flow channel.

The flow from site will be restricted by a Hydrobrake flow control. The flow control will discharge at a maximum rate of 1.5l/s to the ditch, this is the rate specified by Create Consulting, that was approved by the LLFA as part of the original planning application.

The private access and drives will be constructed using pervious techniques to benefit from any limited infiltration and improve water quality. Pervious techniques can be utilised despite the presence of clay within the soils, due to the shallow depth and large infiltration area that this type of drainage provides. The pervious areas will have a minimum of 0.25m of free draining open graded sub-base for water storage refer to drawing 29478/010. The pervious areas have been linked to the drainage network to ensure flows in excess of the sub-base capacity can flow into the piped surface water drainage system.

In the event where the surface water system fails or during an exceedance event, consideration should be given to route surface water away from vulnerable areas towards drainage features. Where possible, the external landscape and paving levels will fall away from the buildings, and the access road levels near buildings will be set lower than the finished floor levels of the buildings. Refer to Drawing No. 29478/805 for overland flow routes.

Further details on the manufacturers information and design of the drainage features can be found on Drawing No.'s 29478/010, 011 & 808 in the **Drawings Appendix**.

Prior to construction, consent should be obtained for the crossing of the ditch by the maintenance access route.

To reduce the risk of flooding due to the failure of the surface water drainage system over its lifespan, regular maintenance should be undertaken.

Where the surface water drainage is within an owner's plot it will be included in the deeds of the plot, that the long term maintenance and repair of the drainage system will be the responsibility of the individual plot owner.

Where the surface water drainage is outside of the responsibility of the owner, a Management Company will be put into place. An annual maintenance charge will apply to plot owners to ensure the maintenance and repair is carried out together with other aspects of the site, such as private roads etc.

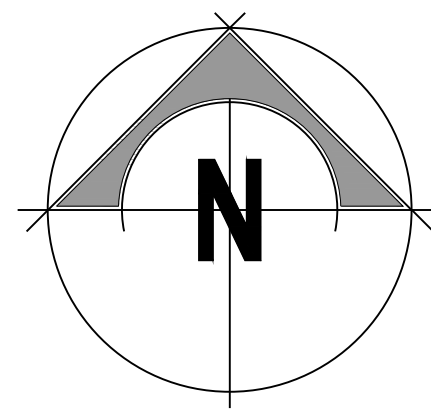
Refer to **Appendix B** for the Surface Water Maintenance Plan detailing the maintenance program, and ongoing maintenance responsibilities for the site.

The increase in hardstanding areas will create an increase in the surface water runoff generated within the site prior to mitigation. However, through the incorporation of a sustainable surface water drainage system the increased surface water runoff will be entirely contained in an attenuation drainage system, and discharge from site at a controlled rate to the ditch, therefore the proposal complies with NPPF.

DRAWINGS APPENDIX

CONTENTS

- Drawing No. 29478/005 - Surface Water Drainage Plan
- Drawing No. 29478/010 - Drainage Details
- Drawing No. 29478/015 - Detention Basin Plan and Details



Note General:

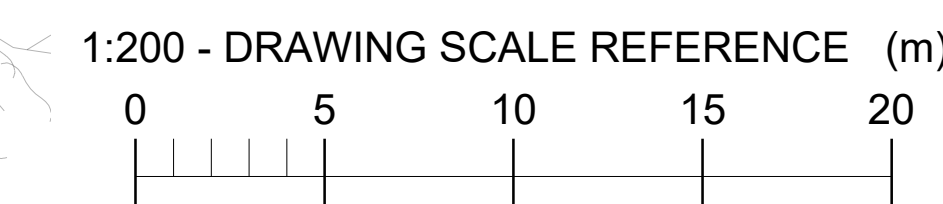
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3. PDC Engineering to be immediately notified of any suspected omissions or discrepancies.
4. All proprietary materials to be fixed strictly in accordance with manufacturer's recommendations using materials approved by the manufacturer.
5. Inspections by the Local Authority, shall be arranged by the contractor to suit their program.
6. Until technical approval has been obtained from the relevant authorities it should be understood that all drawings issued are preliminary and not for construction. Should the contractor start site work prior to approval being given, it is entirely at their own risk.

Note Drainage:

1. Unless noted otherwise all pipework shall be constructed from PVC-U to BS EN 1401-1 bedded and backfilled as per the manufacturer's recommendations and the above listed publications.
2. All private drainage shall be in accordance with BS EN 752 and relevant sections of Approved Document H of the Building Regulations. The Contractor's attention is drawn to Diagrams 7 and 8 of The Building Regulations Approved Document H showing details of drains laid below and near to buildings.
3. Generally, pipes to have granular bed & surround in accordance with manufacturer's recommendations, ensuring adequate protection with respect to depth and location.
4. All surface water pipes to be 150mm ø, and laid no flatter than 1:100 unless stated otherwise.
5. RWP's are shown indicatively only. Refer to architect's drawings for accurate locations.
6. Where surface water drains to ground, the existing ground should be broken up prior to laying the subgrade to aid infiltration.
7. All covers, gratings and frames to chambers, gullies, channels etc. shall be of the correct load class to suit their location.
 - Load Class A15 Domestic gardens (not accessible by vehicles.)
 - Load Class B125 Pedestrian areas where occasional vehicular access is likely
 - Load class C250 Driveways, public open space, paved areas and landscaping
 - Gratings in pedestrian areas to be designed for pedestrian use (in heel safe).
8. All pre-cast and in-situ concrete and mortars used in the construction of drains and sewers shall be made from sulphate resisting cement.
9. All levels and dimensions should be checked on-site by contractors and relevant sub-contractors.
10. Existing services & sewers indicated on this and any other related drawings are not necessarily shown on the drawings. The contractor shall liaise with the utility provider to determine precise location of existing services. Existing services should be marked out on-site prior to any excavation works. All utility company guidelines, and health & safety procedures must be strictly followed.
11. Prior to commencement of the works all drainage outfall points, whether existing sewer, drain, or watercourse, shall be verified on-site by the Contractor. If the outfall point is found to be higher or significantly lower than shown on the drawings then PDC Engineering shall be notified immediately. Prior to commencement of construction on-site the Contractor shall install all off-site drainage connections, or satisfy themselves that there are no obstructions or other reasons why the drainage connections cannot be made.

Feature Key

Site Boundary	—
Proposed Surface Water Sewers	---
Pipe Diameter / Pipe Gradient (Modelling Ref) / Pipe Length	150 @ 1:150 (1:001) 25.5m
Proposed Paving Drain	---
Rainwater Filter Chamber	RFC
Water Butt	WB
Rodding Eye	RE
Overland Flow Routes	→



FOR PLANNING

0	22-02-24	-	MJH	First Issue
Rev	Date	By	Checked	Description

pdc PLANNING DESIGN CIVIL

Units T6 & T7 Snettleton Business Park
Haring Road Snettleton Norfolk NR16 2JU
Telephone: (01953) 452001
E-mail: pdc@pdconengineering.co.uk www.pdconengineering.co.uk
PDC Engineering a Flansted Ltd Company

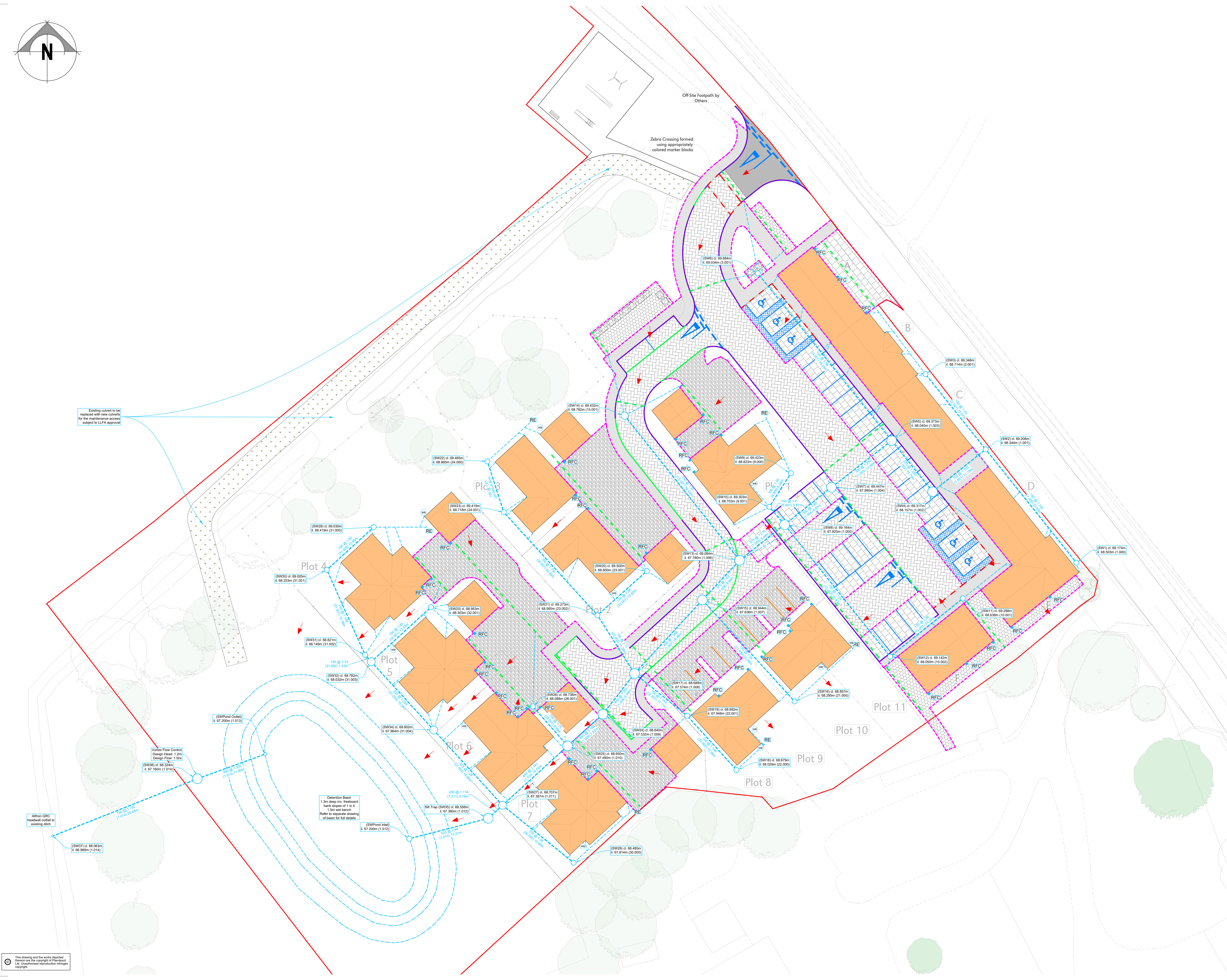
civil • structural • environmental • surveying

Client
Herin Property Investments

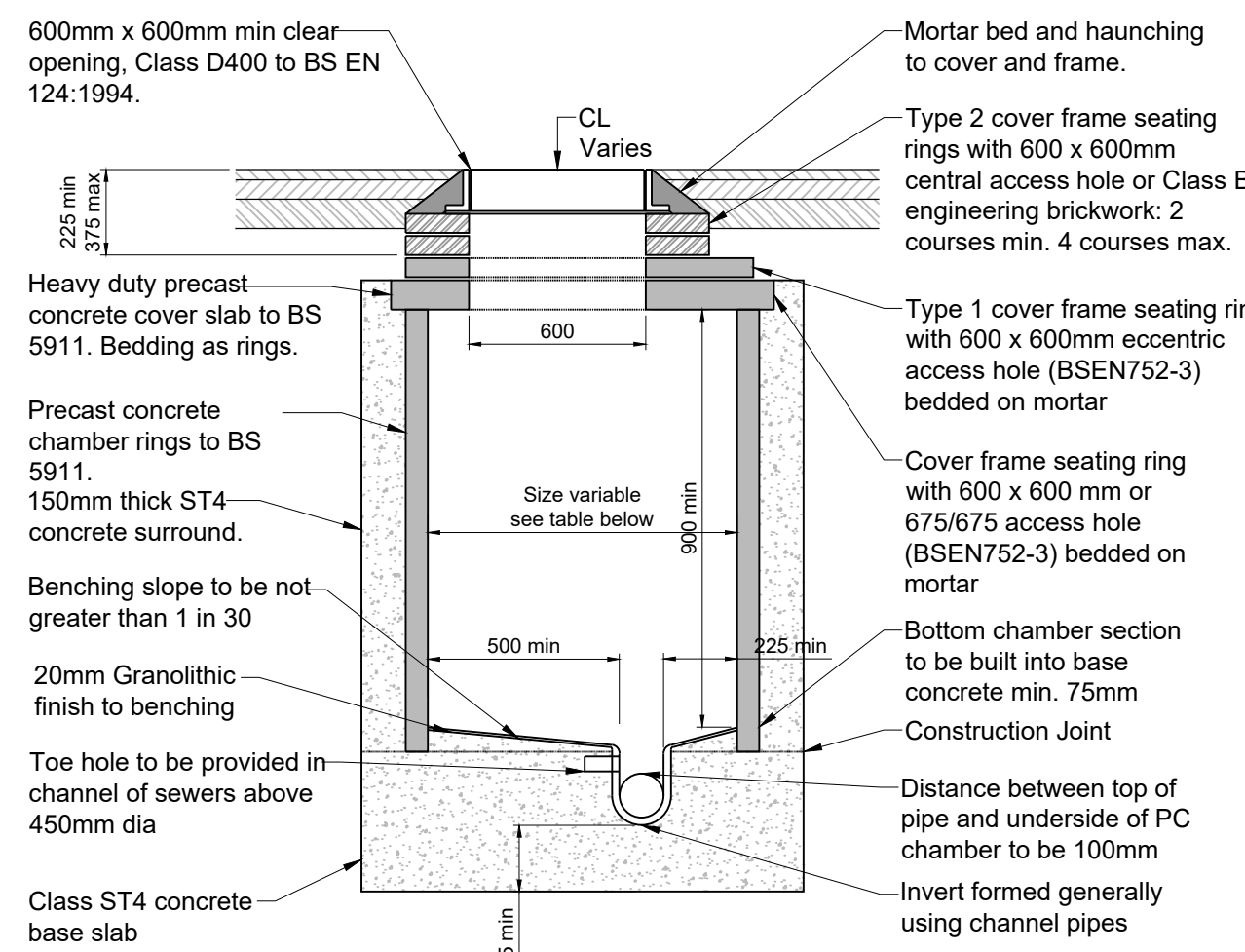
Project
**Willisham Hall
Willisham Hall Road
Willisham, IP8 4SL**

Drawing Title
**Surface Water Drainage
Plan**

Scale	U.N.O.	Date	Drawn By
1:200 (A0)		February 2024	CES
Drawing No.	29478/005	Rev	0



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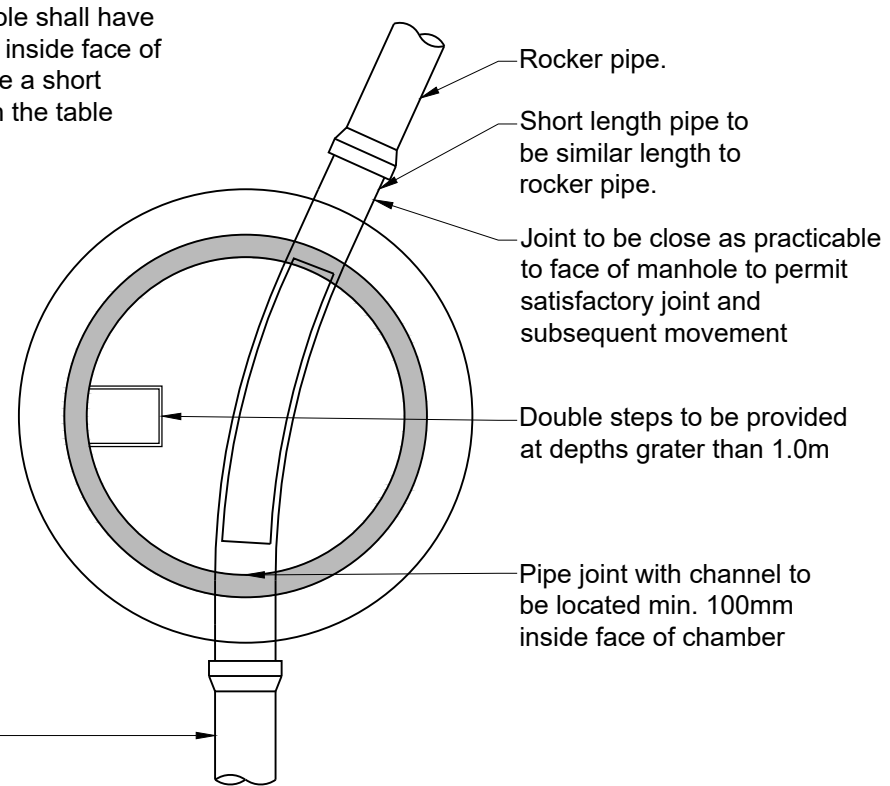


TYPICAL MANHOLE DETAIL (MH)
Scale 1:25

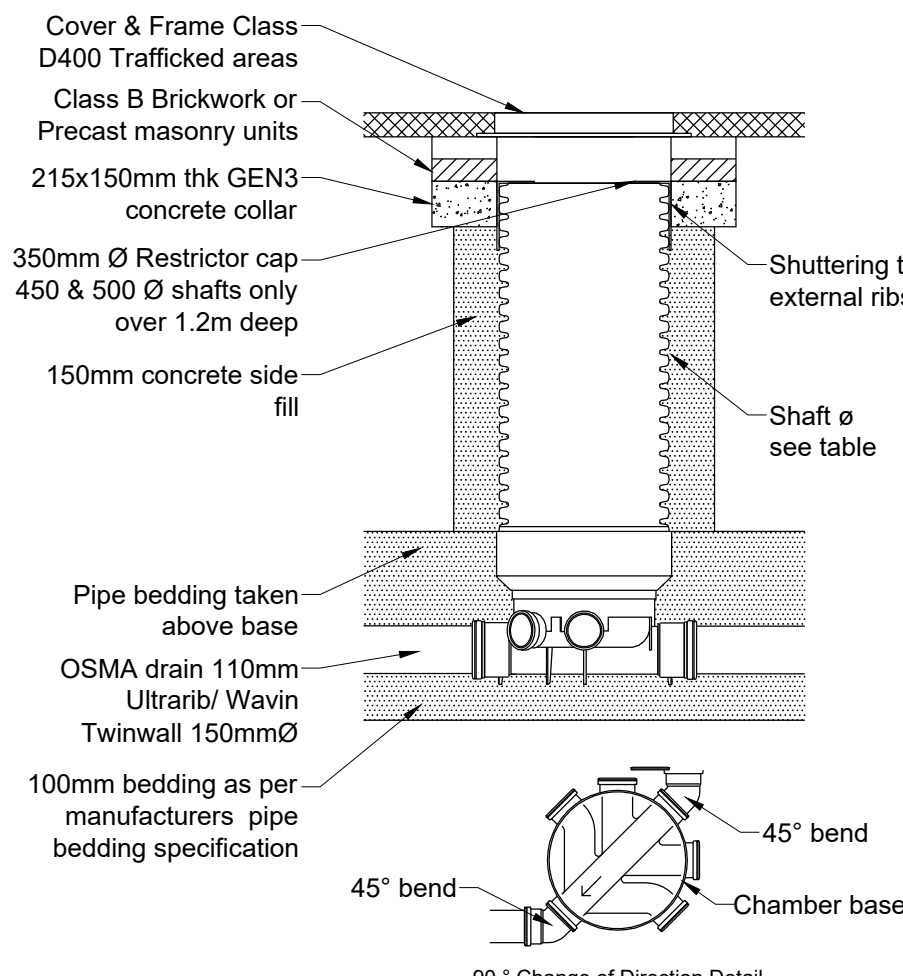
All pipes entering or leaving manhole shall have a flexible joint within 600mm of the inside face of the manhole. The next pipe shall be a short rocker pipe with length as shown in the table below.

Dia of largest pipe in MH (mm)	Int. Dia. of MH (mm)
Less than 375	1200
375 to 700	1500
750 to 900	1800

Pipe Dia	Rocker Pipe Length
150-600	600mm
675-750	1000mm
825 and over	1250mm

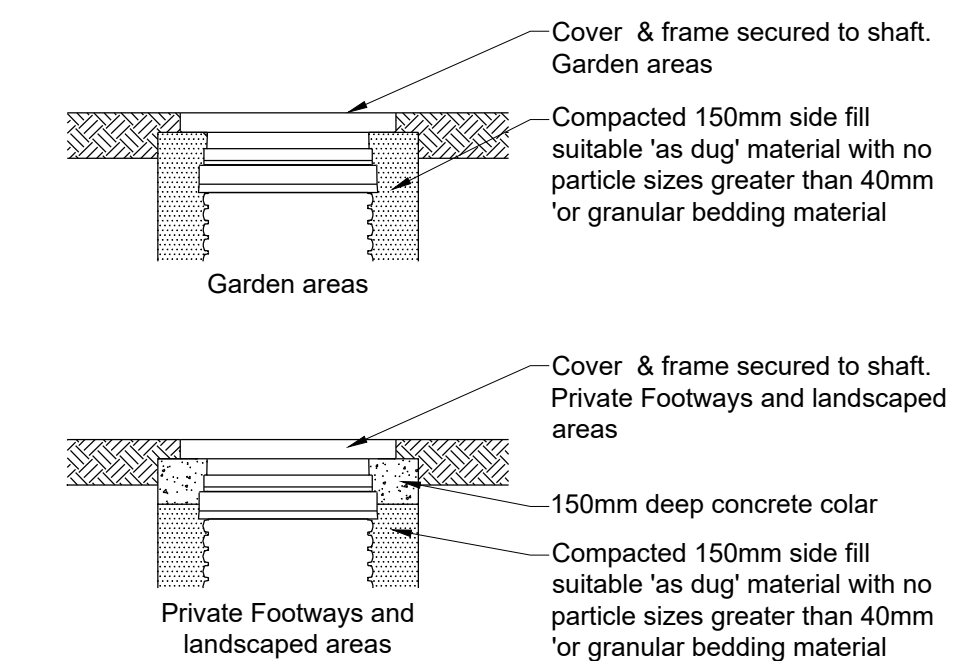


PLAN



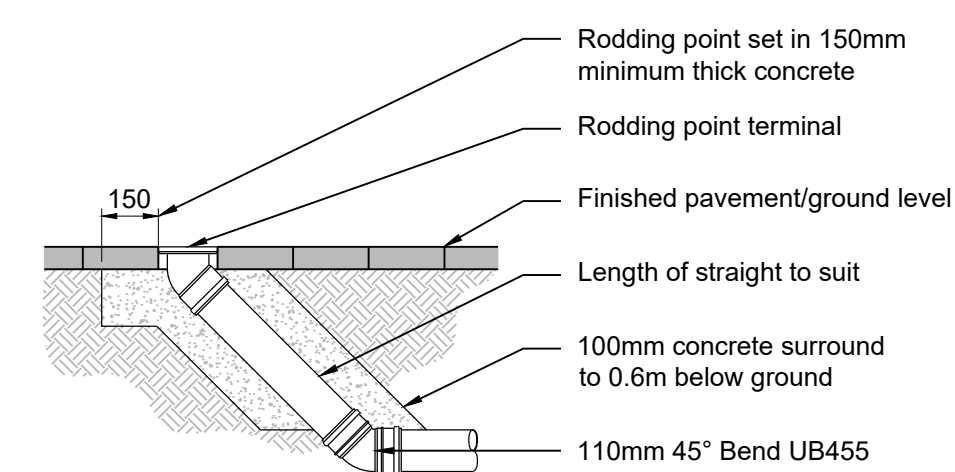
Typical Inspection Chamber Detail (IC)

Note: The above detail provided for guidance only up to date detail to be sourced from manufacture
Scale 1:25

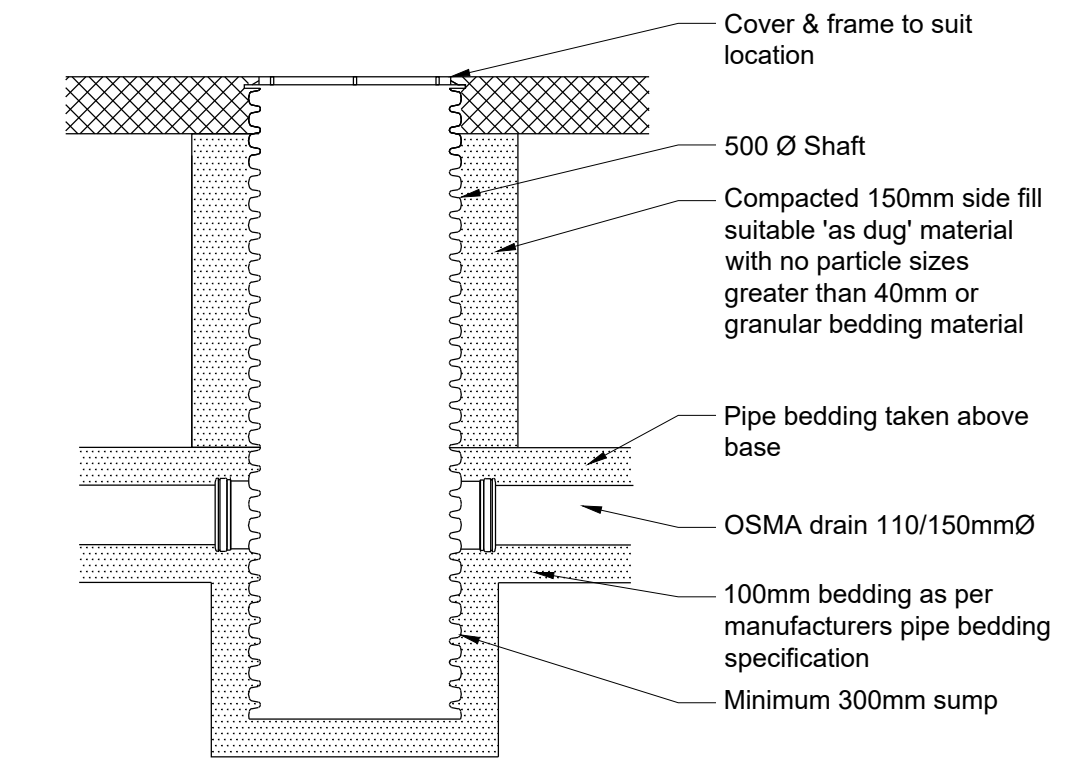


TYPICAL CATCHPIT MANHOLE BASE DETAIL
Scale 1:25

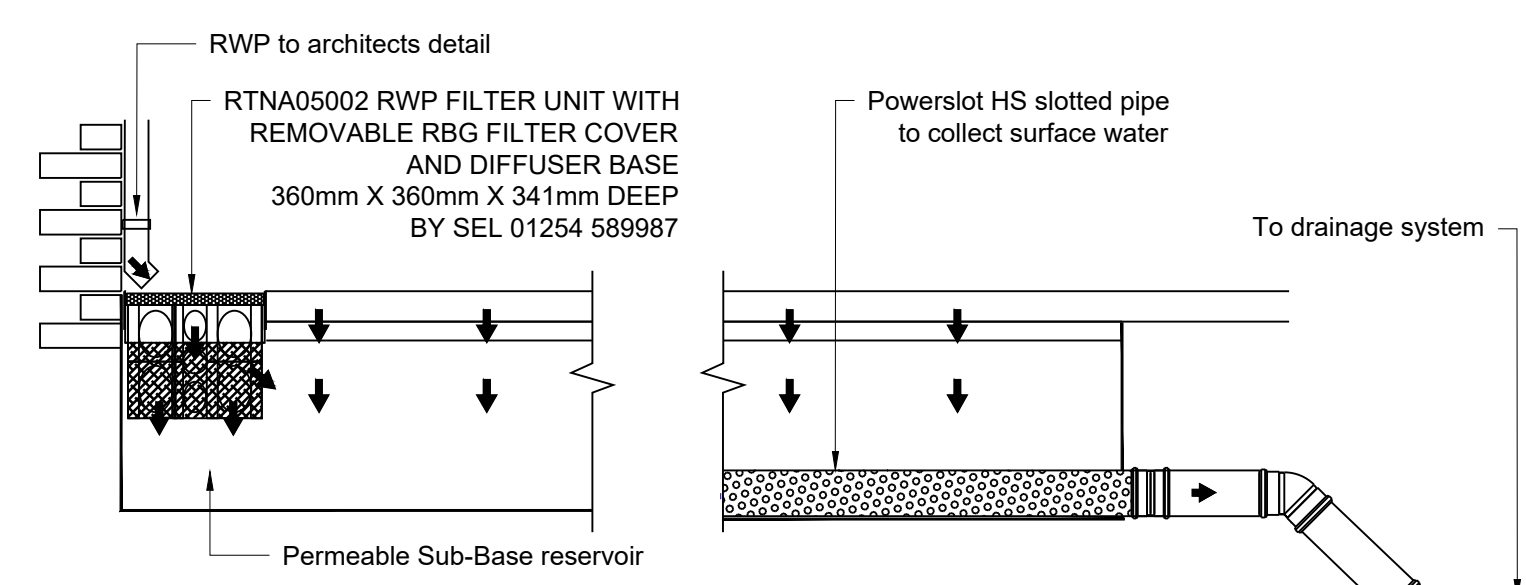
Base Type	Shallow IC	Multi-Base IC	Universal	NIC	Range 200	Range 315	Range 450	Range 600
Shaft Dia (mm)	250	300	450	500	200	315	450	600
Max Invert Depth (m)	0.600	0.6-0.9	1.200	3.000	0.6-2.0	0.6-2.0	1.2-3.0	1.2-3.0
Max No. Inlets	3	3	5	5	1	3	5	3
Inlet Sizes (mm)	110	110	110/ 160	110/ 160	110/ 160	110/ 160	110/ 160	150/225/ 300



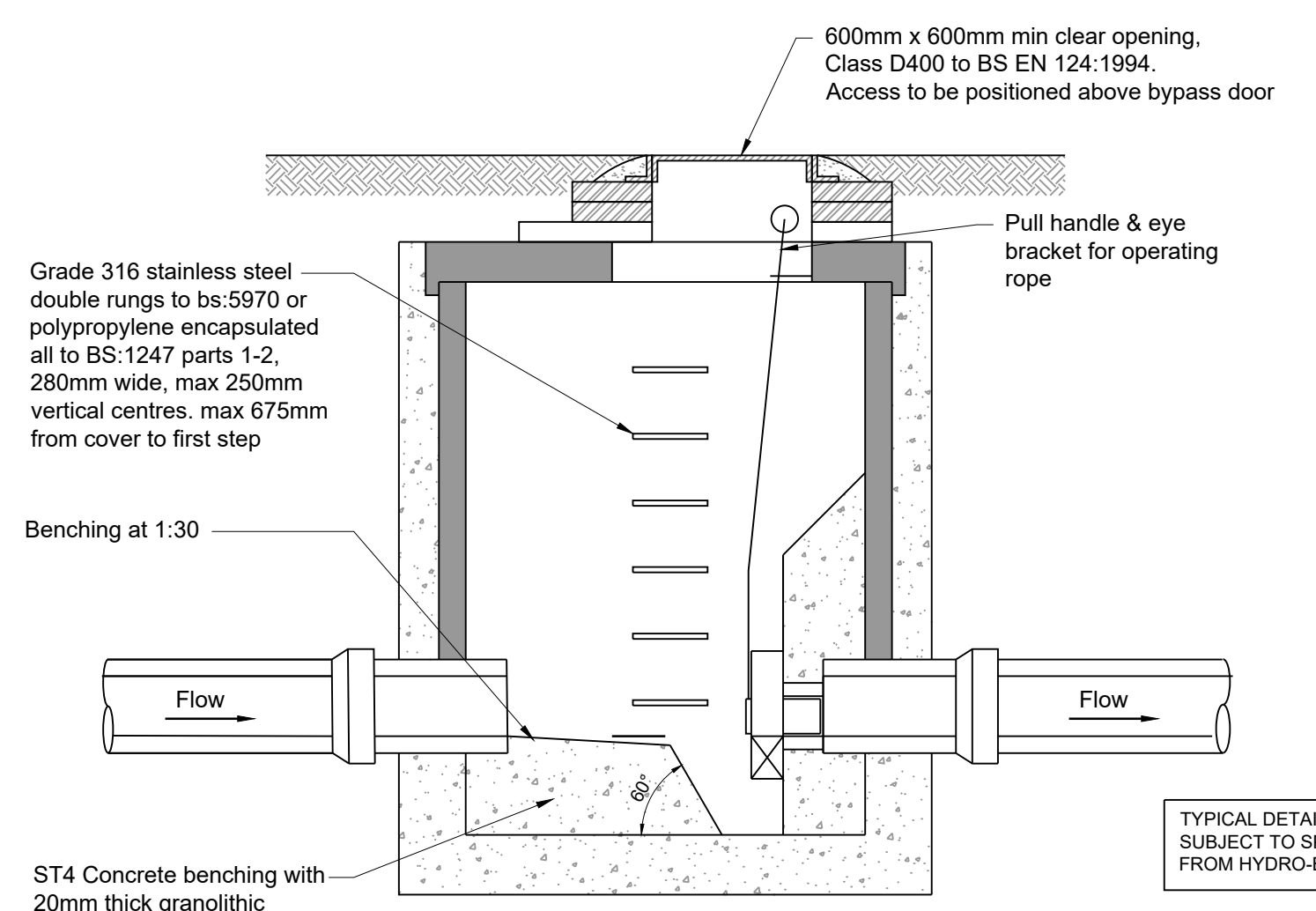
Typical Rodding Eye Access Point Detail
Scale 1:20



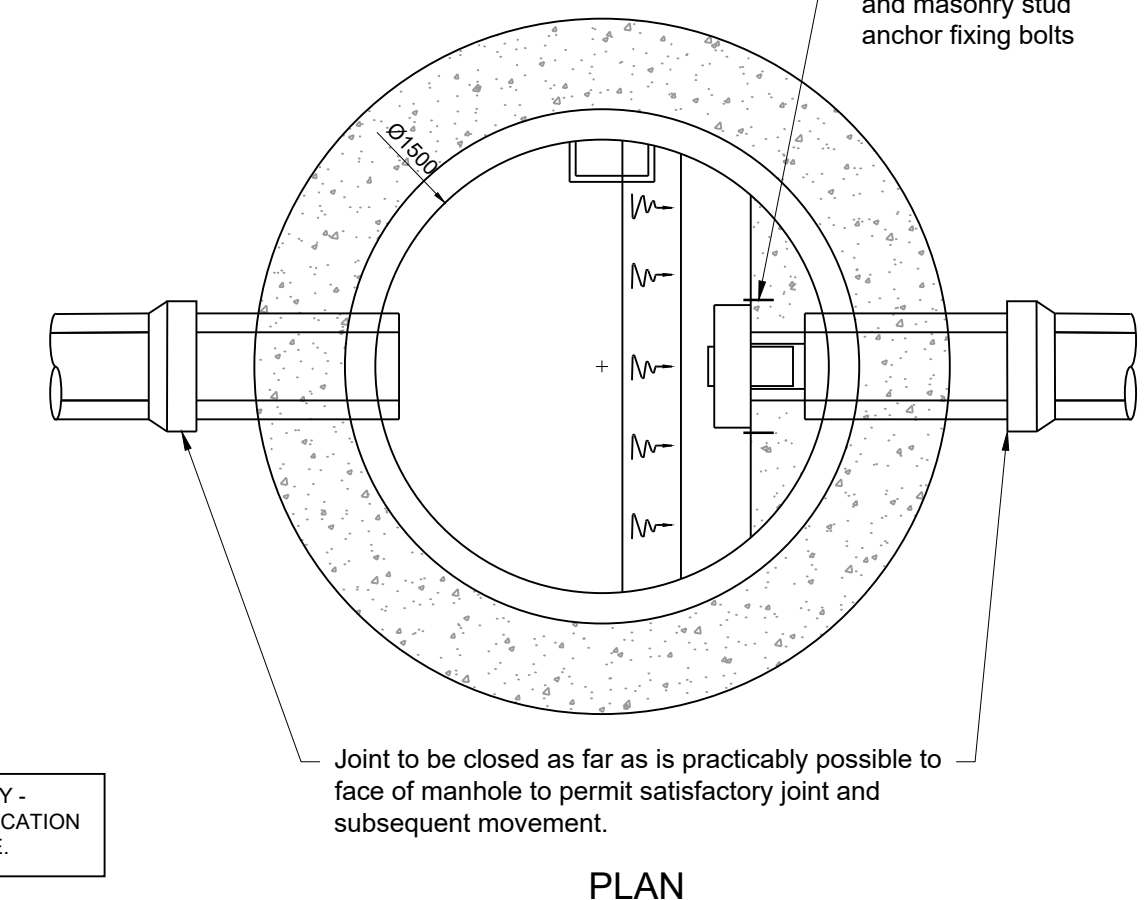
Typical Silt Trap (ST) Arrangement installed as inspection chamber
Scale 1:20



Section through RWP discharging to permeable construction and outlet
Scale 1:20



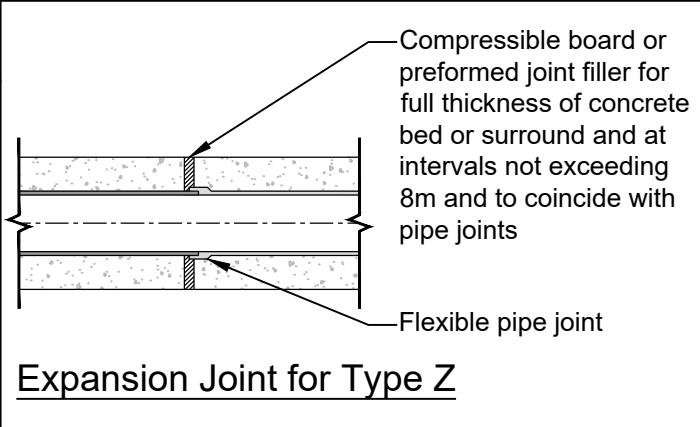
Flow Control Chamber - Typical Section
Scale 1:25
Note: Refer to Typical Manhole Detail for details of manhole construction



- Details Key:**
- Class 8 material to S.H.W. Clause 503.3 (iv)
 - Concrete to S.H.W. Clause 503.3 (iii)
 - General fill to S.H.W. Clause 505.2
 - Topsoil
 - Carriageway construction
 - Granular material Type 1 sub-base to S.H.W. Clause 803 compacted in accordance with Clause 612, table 6/4 method 6
 - Granular material to S.H.W. Clause 503.3 (i) Table 1 below (processed granular bedding and sidefill)
- S.H.W. = Specification for Highway Works
X = Pipe Diameter Ø

- Standard Notes:**
- All dimensions are in millimetres unless stated otherwise.
 - Refer to Appendix 5/1 of S.H.W. for pipe and bedding alternatives.
 - The joint detail for pipe surround on Type Z drains is for flexible joints only.
 - For pipes with nominal diameter below 450mm, the thickness of compressible joint filler board shall be 18mm. For pipes with a nominal diameter of 450mm or greater, but not exceeding 1200mm, the thickness of joint filler board shall be 36mm. For pipes exceeding 1200mm nominal diameter, the thickness of joint filler board shall be 54mm.
 - The minimum or maximum width of the trench applies on and below a line 300mm above the outside top of the pipe. Above the 300mm line the trench backfill material shall be as described in Clause 505 of S.H.W.
 - The concrete bed or surround may extend to the sides of the trench or be a minimum width. Class 8 material is to be used to fill any voids formed.
 - Granular pipe bed and surround material, consisting of natural and/or recycled coarse aggregate or recycled concrete aggregate, should have the following specification (in accordance with clause 503.3 MCDHW).
 - For Type Z trench the concrete cover may be formed to a radius batter or horizontal surface. Minimum cover of concrete shall be 150mm.

Nominal pipe bore (mm)	Nominal maximum partial size (mm)	Material specification
100	10	10mm nominal single sized
100 TO 150	15	10 or 14mm nominal single sized or 14mm to 5mm graded.
150 TO 300	20	10, 14 or 20mm nominal single sized or 14mm to 5mm graded or 20mm to 5mm graded



TYPICAL BEDDING DETAILS

Note: The above details provided for guidance only, refer to manufacturers technical manual for installation guidance and further details.
Scale 1:20

- Note General:**
- All levels relate to Topographical Survey .
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PRELIMINARY

Rev	Date	Rev By	Chkd	Description
0	26-02-24	MJH		First Issue

plandescil
consulting engineers

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

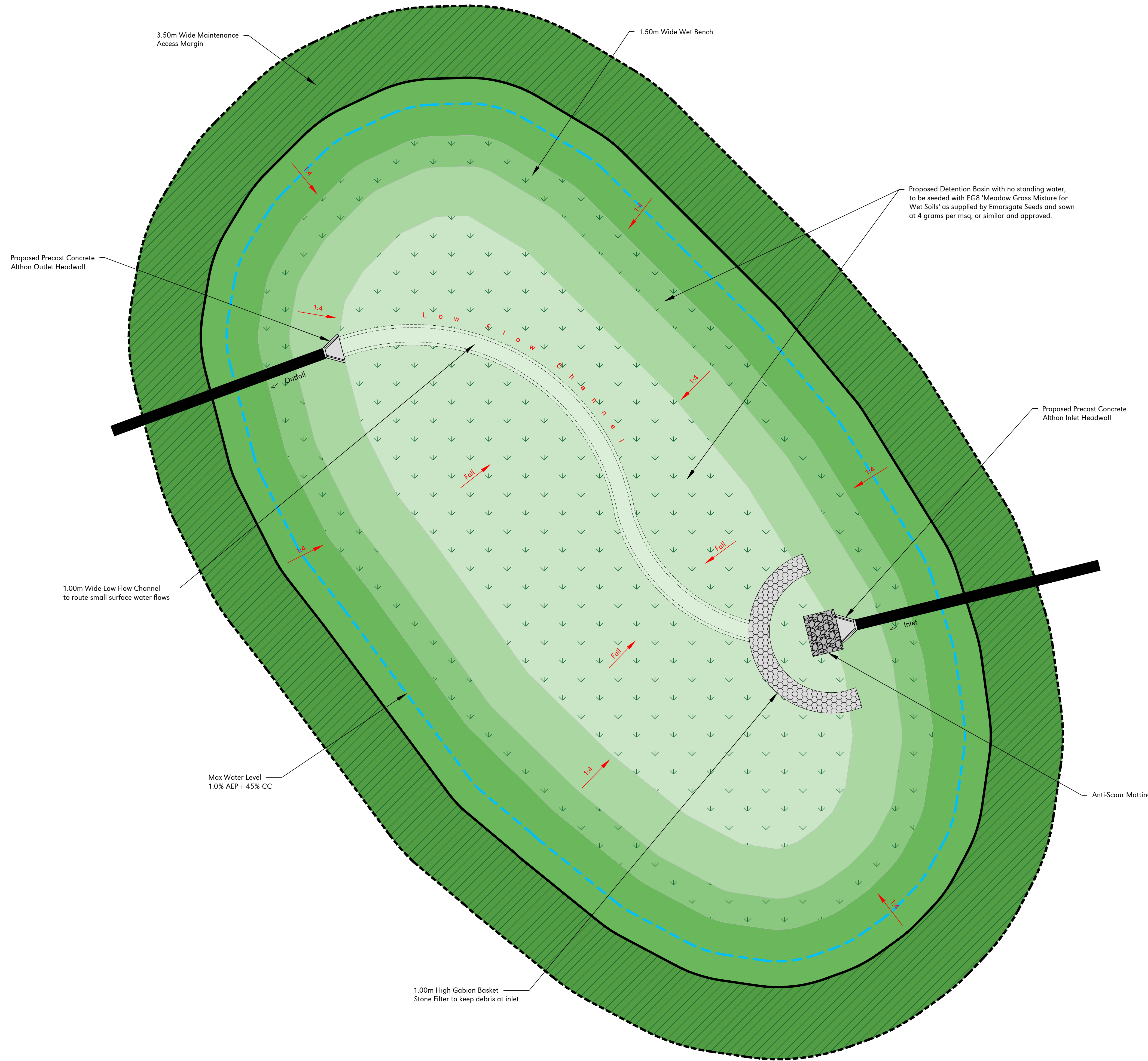
civil / structural / environmental / surveying

Client
Herin Property Investments LLP

Project
**Willisham Hall Barns
Willisham Hall Road,
Willisham, Ipswich, IP8 4SL**

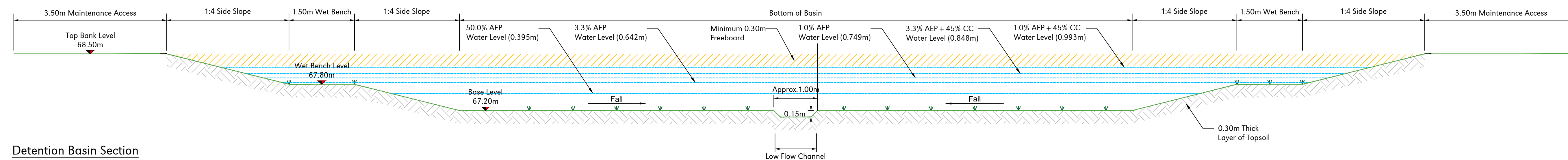
Drawing Title
Drainage Details

Scale	U.N.O.	Date	Drawn By
		February 2024	MJH
Drawing No.	29478/010		Rev
			0



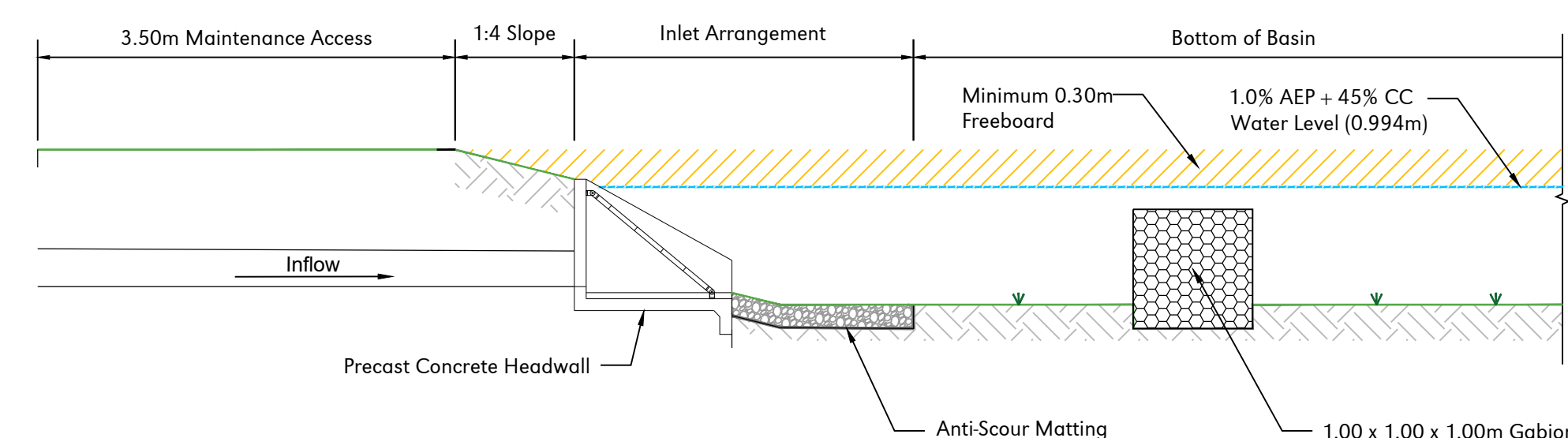
Detention Basin Schematic Plan

Scale 1:100



Detention Basin Section

Scale 1:50



Detention Basin Inlet Section

Scale 1:50

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3. Generally, pipes to have granular bed & surround in accordance with manufacturer's recommendations, ensuring adequate protection with respect to depth and location.
4. All surface water pipes to be 150mm ø, and laid no flatter than 1:100 unless stated otherwise.
5. RWPs are shown indicatively only. Refer to architect's drawings for accurate locations.
6. Where surface water drains to ground, the existing ground should be broken up prior to laying the subgrade to aid infiltration.
7. All covers, gratings and frames to chambers, gullies, channels etc. shall be of the correct load class to suit their location:
 - Load Class A15 Domestic gardens (not accessible by vehicles)
 - Load Class B125 Pedestrian areas where occasional vehicular access is likely
 - Load class C250 Driveways, public open space, paved areas and landscaping
 - Gratings in pedestrian areas to be designed for pedestrian use (i.e. heel safe)
8. All precast and in situ concrete and mortars used in the construction of drains and sewers shall be made from sulphate resisting cement.
9. All levels and dimensions should be checked on-site by contractors and relevant sub-contractors.
10. Existing services & sewers indicated on this and any other related drawings are shown indicatively. All existing public utility services and private apparatus are not necessarily shown on the drawings. The contractor shall liaise with the utility provider to determine precise location of existing services. Existing services should be marked out on-site prior to any excavation works. All utility company guidelines, and health & safety procedures must be strictly followed.
11. Prior to commencement of the works all drainage outfall points, whether existing sewer, drain, or watercourse, shall be verified on-site by the Contractor. If the outfall point is found to be higher or significantly lower than shown on the drawings then PDC Engineering shall be notified immediately. Prior to commencement of construction on-site the Contractor shall install all off-site drainage connections, or satisfy themselves that there are no obstructions or other reasons why the drainage connections cannot be made.

FOR PLANNING

Rev	Date	Rev By	Chkd	Description
0	26-02-24	MIH		First Issue



Units T6 & T7 Snettleton Business Park
Haring Road Snettleton Norfolk NR16 2JU
Telephone: (01953) 452001
E-mail: pdc@pdcengineering.co.uk www.pdcengineering.co.uk
PDC Engineering a Plandesci Ltd Company

civil • structural • environmental • surveying

Client

Herin Property Investments

Project

Willisham Hall,
Willisham Hall Road,
Willisham, IP8 4SL

Drawing Title

Detention Basin Plan
and Details

Scale: U.N.O. Date: February 2024 Drawn By: JFY

As Noted (A1) February 2024 JFY

Drawing No.	Rev
29478/015	0

APPENDIX A

CONTENTS

Info Drainage Design Simulations for the Attenuation System

Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



Detention Basin

Type : Pond

Dimensions

Exceedance Level (m)	68.500
Depth (m)	1.300
Base Level (m)	67.200
Freeboard (mm)	300
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	5.684
Total Volume (m³)	652.239

Depth (m)	Area (m²)	Volume (m³)
0.000	404.00	0.000
0.600	622.00	305.457
0.601	776.00	306.155
1.300	1102.00	959.194

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.012
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

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

Outlets

Outlet

Outgoing Connection	1.013
Outlet Type	Free Discharge

Advanced

Perimeter	Rectangular
Length (m)	52.000
Friction Scheme	Manning's n
n	0.03

Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP1

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.049
Depth (m)	0.250
Base Level (m)	68.799
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	45.080
Long. Slope (1:X)	500.00
Width (m)	5.146
Total Volume (m³)	12.305

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Pervious 2
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Plot B1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	2.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.799

Advanced

Conductivity (m/hr)	0.1
---------------------	-----

Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP2

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.625
Depth (m)	0.250
Base Level (m)	69.375
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	9.668
Long. Slope (1:X)	500.00
Width (m)	1.888
Total Volume (m³)	1.051

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	Pervious 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	3.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.375

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP3

Type : Porous Paving

Dimensions

Exceedance Level (m)	68.988
Depth (m)	0.250
Base Level (m)	68.738
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	14.000
Long. Slope (1:X)	500.00
Width (m)	5.000
Total Volume (m³)	3.743

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Pervious 4
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Plot D-E5
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	10.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.738

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP4

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.442
Depth (m)	0.250
Base Level (m)	69.192
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	14.000
Long. Slope (1:X)	500.00
Width (m)	5.000
Total Volume (m³)	3.743

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Pervious 5
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Plot F2
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	11.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.192

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP5

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.235
Depth (m)	0.250
Base Level (m)	68.985
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	28.720
Long. Slope (1:X)	500.00
Width (m)	7.660
Total Volume (m³)	11.556

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Road 3 Road 5 Road 4
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	8.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.985

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP6

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.179
Depth (m)	0.250
Base Level (m)	68.929
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	12.500
Long. Slope (1:X)	500.00
Width (m)	5.000
Total Volume (m³)	3.342

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Parking 5
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	12.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.929

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP7

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.152
Depth (m)	0.250
Base Level (m)	68.902
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	12.460
Long. Slope (1:X)	500.00
Width (m)	7.500
Total Volume (m³)	4.920

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Parking 4
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	13.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.902

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP8

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.329
Depth (m)	0.250
Base Level (m)	69.079
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	32.400
Long. Slope (1:X)	500.00
Width (m)	5.000
Total Volume (m³)	8.634

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Parking 2
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	6.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.079

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP9

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.524
Depth (m)	0.250
Base Level (m)	69.274
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	33.000
Long. Slope (1:X)	500.00
Width (m)	5.000
Total Volume (m³)	8.793

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Parking 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	5.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.274

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP10

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.706
Depth (m)	0.250
Base Level (m)	69.456
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	18.500
Long. Slope (1:X)	500.00
Width (m)	6.000
Total Volume (m³)	5.887

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Road 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	4.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.456

Advanced

Conductivity (m/hr)	0.1
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	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP11

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.425
Depth (m)	0.250
Base Level (m)	69.175
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	41.000
Long. Slope (1:X)	500.00
Width (m)	6.100
Total Volume (m³)	13.200

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Road 2
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	7.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.175

Advanced

Conductivity (m/hr)	0.1
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	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP12

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.500
Depth (m)	0.250
Base Level (m)	69.250
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	11.830
Long. Slope (1:X)	500.00
Width (m)	11.830
Total Volume (m³)	7.284

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Driveway 1
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Plot 1A Garage 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	17.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.250

Advanced

Conductivity (m/hr)	0.1
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	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP13

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.554
Depth (m)	0.250
Base Level (m)	69.304
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	12.000
Long. Slope (1:X)	500.00
Width (m)	5.000
Total Volume (m³)	3.208

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Pervious 3
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	15.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.304

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP14

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.094
Depth (m)	0.250
Base Level (m)	68.844
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	4.800
Long. Slope (1:X)	500.00
Width (m)	4.800
Total Volume (m³)	1.234

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Parking 6
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	19.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.844

Advanced

Conductivity (m/hr)	0.1
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PP15

Type : Porous Paving

Dimensions

Exceedance Level (m)	68.957
Depth (m)	0.250
Base Level (m)	68.707
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	8.900
Long. Slope (1:X)	500.00
Width (m)	8.900
Total Volume (m³)	4.150

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Road 8
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	20.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.707

Advanced

Conductivity (m/hr)	0.1
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PP16

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.391
Depth (m)	0.250
Base Level (m)	69.141
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	20.000
Long. Slope (1:X)	500.00
Width (m)	6.500
Total Volume (m³)	6.873

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Road 6
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	16.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.141

Advanced

Conductivity (m/hr)	0.1
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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP17

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.494
Depth (m)	0.250
Base Level (m)	69.244
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	28.125
Long. Slope (1:X)	500.00
Width (m)	4.800
Total Volume (m³)	7.216

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Road 7
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	18.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.244

Advanced

Conductivity (m/hr)	0.1
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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP18

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.420
Depth (m)	0.250
Base Level (m)	69.170
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	22.650
Long. Slope (1:X)	500.00
Width (m)	8.830
Total Volume (m³)	10.473

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Driveway 2
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Garage 3B Plot 3B Plot 2A Garage 2A
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	23.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	69.170

Advanced

Conductivity (m/hr)	0.1
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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP19

Type : Porous Paving

Dimensions

Exceedance Level (m)	68.743
Depth (m)	0.250
Base Level (m)	68.493
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	15.830
Long. Slope (1:X)	500.00
Width (m)	6.000
Total Volume (m³)	5.039

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Road 9
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	26.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.493

Advanced

Conductivity (m/hr)	0.1
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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP20

Type : Porous Paving

Dimensions

Exceedance Level (m)	68.726
Depth (m)	0.250
Base Level (m)	68.476
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	17.220
Long. Slope (1:X)	500.00
Width (m)	14.520
Total Volume (m³)	12.963

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Driveway 7
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Plot 8-9A
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	25.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.476

Advanced

Conductivity (m/hr)	0.1
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	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP21

Type : Porous Paving

Dimensions

Exceedance Level (m)	68.452
Depth (m)	0.250
Base Level (m)	68.202
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	16.660
Long. Slope (1:X)	500.00
Width (m)	8.400
Total Volume (m³)	7.342

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Driveway 5
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Plot 7B Garage 7A
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	29.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.202

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP22

Type : Porous Paving

Dimensions

Exceedance Level (m)	68.625
Depth (m)	0.250
Base Level (m)	68.375
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	26.740
Long. Slope (1:X)	500.00
Width (m)	4.600
Total Volume (m³)	6.590

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Road 10
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	27.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.375

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP23

Type : Porous Paving

Dimensions

Exceedance Level (m)	68.774
Depth (m)	0.250
Base Level (m)	68.524
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	33.000
Long. Slope (1:X)	500.00
Width (m)	11.000
Total Volume (m³)	18.891

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Driveway 4
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Plot 6A Garage 5B Plot 5B Garage 6A
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	28.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.524

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP24

Type : Porous Paving

Dimensions

Exceedance Level (m)	68.968
Depth (m)	0.250
Base Level (m)	68.718
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	7.750
Long. Slope (1:X)	500.00
Width (m)	7.750
Total Volume (m³)	3.159

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Driveway 3
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Garage 4B Plot 4B
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	32.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.718

Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



PP25

Type : Porous Paving

Dimensions

Exceedance Level (m)	69.104
Depth (m)	0.250
Base Level (m)	68.854
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	1000.0
Porosity (%)	30
Length (m)	12.500
Long. Slope (1:X)	500.00
Width (m)	5.000
Total Volume (m³)	3.342

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Parking 3
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	14.000
Outlet Type	Orifice
Diameter (m)	0.150
Coefficient of Discharge	0.600
Invert Level (m)	68.854


Advanced

Conductivity (m/hr)	0.1
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Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Inflow Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Access	6		Time of Concentration	0.008	100	0	100	0.008
Basin	Detention Basin		Time of Concentration	0.128	100	0	100	0.128
Driveway 1	PP12		Time of Concentration	0.014	100	0	100	0.014
Driveway 2	PP18		Time of Concentration	0.020	100	0	100	0.020
Driveway 3	PP24		Time of Concentration	0.006	100	0	100	0.006
Driveway 4	PP23		Time of Concentration	0.033	100	0	100	0.033
Driveway 5	PP21		Time of Concentration	0.014	100	0	100	0.014
Driveway 6	PP20		Time of Concentration	0.015	100	0	100	0.015
Driveway 7	PP20		Time of Concentration	0.010	100	0	100	0.010
Footpath 1	6		Time of Concentration	0.010	100	0	100	0.010
Garage 1	PP12		Time of Concentration	0.004	100	0	100	0.004
Garage 2A	PP18		Time of Concentration	0.002	100	0	100	0.002
Garage 2B	20		Time of Concentration	0.002	100	0	100	0.002
Garage 3B	PP18		Time of Concentration	0.002	100	0	100	0.002
Garage 3A	22		Time of Concentration	0.002	100	0	100	0.002
Garage 4B	PP24		Time of Concentration	0.002	100	0	100	0.002
Garage 4A	29		Time of Concentration	0.002	100	0	100	0.002
Garage 5B	PP23		Time of Concentration	0.002	100	0	100	0.002
Garage 5A	33		Time of Concentration	0.002	100	0	100	0.002
Garage 6B	25		Time of Concentration	0.002	100	0	100	0.002
Garage 6A	PP23		Time of Concentration	0.002	100	0	100	0.002


Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024				
Report Details: Type: Inflow Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH		
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park				

Garage 7B	19		Time of Concentration	0.002	100	0	100	0.002
Garage 7A	PP21		Time of Concentration	0.002	100	0	100	0.002
Parking 1	PP9		Time of Concentration	0.021	100	0	100	0.021
Parking 2	PP8		Time of Concentration	0.024	100	0	100	0.024
Parking 3	PP25		Time of Concentration	0.006	100	0	100	0.006
Parking 4	PP7		Time of Concentration	0.009	100	0	100	0.009
Parking 5	PP6		Time of Concentration	0.008	100	0	100	0.008
Parking 6	PP14		Time of Concentration	0.002	100	0	100	0.002
Pervious 1	PP2		Time of Concentration	0.002	100	0	100	0.002
Pervious 2	PP1		Time of Concentration	0.010	100	0	100	0.010
Pervious 3	PP13		Time of Concentration	0.006	100	0	100	0.006
Pervious 4	PP3		Time of Concentration	0.007	100	0	100	0.007
Pervious 5	PP4		Time of Concentration	0.007	100	0	100	0.007
Plot2D	20		Time of Concentration	0.003	100	0	100	0.003
Plot10-11C	16		Time of Concentration	0.003	100	0	100	0.003
Plot10-11 A	PP20		Time of Concentration	0.005	100	0	100	0.005
Plot 1D	9		Time of Concentration	0.001	100	0	100	0.001
Plot 1C	10		Time of Concentration	0.005	100	0	100	0.005
Plot 1A	PP12		Time of Concentration	0.004	100	0	100	0.004
Plot 1B	9		Time of Concentration	0.002	100	0	100	0.002
Plot 2A	PP18		Time of Concentration	0.002	100	0	100	0.002
Plot 2B	20		Time of Concentration	0.002	100	0	100	0.002


Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Details: Type: Inflow Summary Storm Phase: Phase	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



Plot 2C	23		Time of Concentration	0.003	100	0	100	0.003
Plot 3A	22		Time of Concentration	0.004	100	0	100	0.004
Plot 3B	PP18		Time of Concentration	0.002	100	0	100	0.002
Plot 3C	23		Time of Concentration	0.004	100	0	100	0.004
Plot 4A	29		Time of Concentration	0.004	100	0	100	0.004
Plot 4B	PP24		Time of Concentration	0.002	100	0	100	0.002
Plot 4C	30		Time of Concentration	0.004	100	0	100	0.004
Plot 4D	31		Time of Concentration	0.003	100	0	100	0.003
Plot 5A	33		Time of Concentration	0.006	100	0	100	0.006
Plot 5B	PP23		Time of Concentration	0.002	100	0	100	0.002
Plot 5C	32		Time of Concentration	0.002	100	0	100	0.002
Plot 5D	34		Time of Concentration	0.002	100	0	100	0.002
Plot 6A	PP23		Time of Concentration	0.004	100	0	100	0.004
Plot 6B	25		Time of Concentration	0.002	100	0	100	0.002
Plot 6D	25		Time of Concentration	0.002	100	0	100	0.002
Plot 6C	34		Time of Concentration	0.005	100	0	100	0.005
Plot 7C	28		Time of Concentration	0.007	100	0	100	0.007
Plot 7B	PP21		Time of Concentration	0.004	100	0	100	0.004
Plot 7A	25		Time of Concentration	0.002	100	0	100	0.002
Plot 8-9C	16		Time of Concentration	0.001	100	0	100	0.001
Plot 8-9B	18		Time of Concentration	0.005	100	0	100	0.005
Plot 8-9A	PP20		Time of Concentration	0.005	100	0	100	0.005

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024				
Report Details: Type: Inflow Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH		
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park				

Plot 10-11B	16		Time of Concentration	0.002	100	0	100	0.002
Plot A1	6		Time of Concentration	0.010	100	0	100	0.010
Plot B1	PP1		Time of Concentration	0.005	100	0	100	0.005
Plot B2	6		Time of Concentration	0.005	100	0	100	0.005
Plot C1	3		Time of Concentration	0.002	100	0	100	0.002
Plot C2	2		Time of Concentration	0.003	100	0	100	0.003
Plot C3	5		Time of Concentration	0.002	100	0	100	0.002
Plot C4	2		Time of Concentration	0.003	100	0	100	0.003
Plot D-E1	2		Time of Concentration	0.002	100	0	100	0.002
Plot D-E2	1		Time of Concentration	0.006	100	0	100	0.006
Plot D-E3	4		Time of Concentration	0.005	100	0	100	0.005
Plot D-E4	11		Time of Concentration	0.004	100	0	100	0.004
Plot D-E5	PP3		Time of Concentration	0.004	100	0	100	0.004
Plot F1	11		Time of Concentration	0.006	100	0	100	0.006
Plot F2	PP4		Time of Concentration	0.006	100	0	100	0.006
Road 1	PP10		Time of Concentration	0.015	100	0	100	0.015
Road 2	PP11		Time of Concentration	0.025	100	0	100	0.025
Road 3	PP5		Time of Concentration	0.022	100	0	100	0.022
Road 4	PP5		Time of Concentration	0.007	100	0	100	0.007
Road 5	PP5		Time of Concentration	0.008	100	0	100	0.008
Road 6	PP16		Time of Concentration	0.017	100	0	100	0.017
Road 7	PP17		Time of Concentration	0.018	100	0	100	0.018

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024			
Report Details: Type: Inflow Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH	
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park			

Road 8	PP15		Time of Concentration	0.009	100	0	100	0.009
Road 9	PP19		Time of Concentration	0.012	100	0	100	0.012
Road 10	PP22		Time of Concentration	0.021	100	0	100	0.021
TOTAL		0.0		0.709				0.709

Project: 29478 Attenuation Rev0 Willisham Barns Willisham	Date: 22/02/2024		
	Designed by: CES	Checked by: MJH	Approved By: MJH
Report Title: Rainfall Analysis Criteria	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Reduced
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	<input type="checkbox"/>

Rainfall

FEH	Type: FEH
Site Location	GB 606966 250623 TM 06966 50623
Rainfall Version	2022
Summer	<input checked="" type="checkbox"/>
Winter	<input checked="" type="checkbox"/>

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	45.000
100.0	0.000
30.0	45.000
30.0	0.000
2.0	0.000

Storm Durations


Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
3	FEH: 100 years: +45 %: 15 mins: Summer	69.364	68.714	68.744	0.030	2.4	0.006	0.000	2.4	3.070	OK
2	FEH: 100 years: +45 %: 15 mins: Summer	69.202	68.344	68.443	0.100	13.2	0.020	0.000	12.2	7.805	OK
1	FEH: 100 years: +45 %: 15 mins: Summer	69.203	68.503	68.561	0.058	4.8	0.011	0.000	4.6	2.072	OK
6	FEH: 100 years: +45 %: 15 mins: Summer	69.684	69.034	69.177	0.143	31.1	0.028	0.000	28.9	16.381	OK
5	FEH: 100 years: +45 %: 15 mins: Summer	69.283	68.040	68.241	0.201	53.5	0.227	0.000	51.8	38.162	OK
4	FEH: 100 years: +45 %: 15 mins: Summer	69.227	68.157	68.274	0.118	16.2	0.133	0.000	15.5	9.406	OK
7	FEH: 100 years: +45 %: 15 mins: Summer	69.447	67.990	68.156	0.166	59.7	0.187	0.000	58.0	52.335	OK
8	FEH: 100 years: +45 %: 15 mins: Summer	69.164	67.825	68.078	0.253	82.7	0.286	0.000	80.8	72.507	OK
10	FEH: 100 years: +45 %: 15 mins: Summer	69.303	68.703	68.734	0.031	6.3	0.006	0.000	6.3	2.765	OK
9	FEH: 100 years: +45 %: 15 mins: Summer	69.423	68.823	68.862	0.039	2.4	0.008	0.000	2.3	1.036	OK
12	FEH: 100 years: +45 %: 15 mins: Summer	69.142	68.050	68.269	0.219	15.5	0.043	0.000	14.5	10.945	Surcharged
11	FEH: 100 years: +45 %: 15 mins: Summer	69.288	68.638	68.697	0.059	11.4	0.011	0.000	11.2	6.882	OK
13	FEH: 100 years: +45 %: 15 mins: Summer	69.084	67.780	68.023	0.243	107.9	0.274	0.000	109.9	93.111	OK
15	FEH: 100 years: +45 %: 15 mins: Summer	68.942	67.636	67.965	0.329	111.1	0.372	0.000	113.9	94.646	OK
16	FEH: 100 years: +45 %: 15 mins: Summer	68.895	68.295	68.342	0.048	4.8	0.009	0.000	4.7	2.072	OK
14	FEH: 100 years: +45 %: 15 mins: Summer	69.432	68.782	68.858	0.076	16.4	0.015	0.000	16.5	12.608	OK
17	FEH: 100 years: +45 %: 15 mins: Summer	68.689	67.574	67.924	0.350	140.4	0.396	0.000	143.4	121.077	OK
20	FEH: 100 years: +45 %: 15 mins: Summer	69.500	68.850	68.912	0.062	9.0	0.012	0.000	9.0	9.062	OK
21	FEH: 100 years: +45 %: 15 mins: Summer	69.273	68.565	68.624	0.059	17.9	0.012	0.000	17.5	13.508	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham				Date: 22/02/2024							
Report Details: Type: Junctions Summary Storm Phase: Phase				Designed by: CES	Checked by: MJH	Approved By: MJH					
				Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park							


23	FEH: 100 years: +45 %: 15 mins: Summer	69.42 3	68.71 8	68.814	0.097	10.2	0.019	0.000	9.9	4.498	OK
22	FEH: 100 years: +45 %: 15 mins: Summer	69.46 5	68.86 5	68.934	0.068	4.8	0.013	0.000	4.6	2.073	OK
19	FEH: 100 years: +45 %: 15 mins: Summer	68.68 2	67.94 8	68.014	0.066	5.5	0.013	0.000	5.2	2.391	OK
18	FEH: 100 years: +45 %: 15 mins: Summer	68.67 9	68.02 9	68.083	0.055	4.0	0.011	0.000	3.9	1.728	OK
24	FEH: 100 years: +45 %: 15 mins: Summer	68.62 9	67.53 2	67.871	0.339	151.1	0.384	0.000	152.9	126.765	OK
25	FEH: 100 years: +45 %: 15 mins: Summer	68.65 0	67.49 0	67.806	0.316	167.2	0.357	0.000	169.1	141.167	OK
26	FEH: 100 years: +45 %: 15 mins: Summer	68.73 8	68.08 8	68.125	0.037	6.8	0.007	0.000	6.8	6.927	OK
27	FEH: 100 years: +45 %: 15 mins: Summer	68.70 7	67.38 7	67.696	0.309	182.4	0.350	0.000	183.8	155.552	OK
35	FEH: 100 years: +45 %: 15 mins: Summer	68.55 6	67.36 0	67.617	0.257	183.8	0.291	0.000	184.2	154.426	OK
28	FEH: 100 years: +45 %: 15 mins: Summer	68.46 4	67.81 4	67.857	0.043	5.6	0.008	0.000	5.5	2.417	OK
34	FEH: 100 years: +45 %: 15 mins: Summer	68.82 8	67.96 4	68.041	0.077	26.0	0.087	0.000	25.4	13.487	OK
32	FEH: 100 years: +45 %: 15 mins: Summer	68.78 2	68.03 2	68.156	0.124	21.4	0.141	0.000	20.4	11.085	OK
31	FEH: 100 years: +45 %: 15 mins: Summer	68.79 9	68.14 9	68.213	0.064	10.1	0.013	0.000	9.9	4.491	OK
30	FEH: 100 years: +45 %: 15 mins: Summer	69.00 5	68.25 3	68.334	0.081	7.8	0.016	0.000	7.7	3.456	OK
33	FEH: 100 years: +45 %: 15 mins: Summer	68.95 3	68.30 3	68.368	0.065	10.0	0.013	0.000	9.9	5.943	OK
29	FEH: 100 years: +45 %: 15 mins: Summer	69.01 9	68.41 9	68.487	0.068	4.8	0.013	0.000	4.6	2.073	OK
36	FEH: 100 years: +45 %: 15 mins: Summer	68.32 4	67.16 0	67.615	0.454	7.4	0.514	0.000	0.9	1.063	Surcharge d
37	FEH: 100 years: +45 %: 15 mins: Summer	68.06 3	66.98 9	67.015	0.025	0.9	0.000	0.000	0.9	0.968	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
3	FEH: 100 years: +0 %: 15 mins: Summer	69.36 4	68.71 4	68.736	0.023	1.5	0.004	0.000	1.4	1.674	OK
2	FEH: 100 years: +0 %: 15 mins: Summer	69.20 2	68.34 4	68.421	0.077	9.0	0.015	0.000	8.3	4.936	OK
1	FEH: 100 years: +0 %: 15 mins: Summer	69.20 3	68.50 3	68.551	0.048	3.3	0.009	0.000	3.2	1.429	OK
6	FEH: 100 years: +0 %: 15 mins: Summer	69.68 4	69.03 4	69.125	0.091	20.9	0.018	0.000	20.4	11.130	OK
5	FEH: 100 years: +0 %: 15 mins: Summer	69.28 3	68.04 0	68.194	0.153	36.3	0.173	0.000	34.3	25.107	OK
4	FEH: 100 years: +0 %: 15 mins: Summer	69.22 7	68.15 7	68.247	0.090	11.1	0.102	0.000	10.6	6.015	OK
7	FEH: 100 years: +0 %: 15 mins: Summer	69.44 7	67.99 0	68.115	0.125	38.7	0.141	0.000	37.2	34.064	OK
8	FEH: 100 years: +0 %: 15 mins: Summer	69.16 4	67.82 5	68.008	0.183	53.7	0.207	0.000	52.2	47.499	OK
10	FEH: 100 years: +0 %: 15 mins: Summer	69.30 3	68.70 3	68.728	0.025	4.3	0.005	0.000	4.3	1.898	OK
9	FEH: 100 years: +0 %: 15 mins: Summer	69.42 3	68.82 3	68.855	0.032	1.6	0.006	0.000	1.6	0.709	OK
12	FEH: 100 years: +0 %: 15 mins: Summer	69.14 2	68.05 0	68.131	0.081	9.3	0.016	0.000	9.1	7.369	OK
11	FEH: 100 years: +0 %: 15 mins: Summer	69.28 8	68.63 8	68.684	0.046	7.2	0.009	0.000	7.1	4.659	OK
13	FEH: 100 years: +0 %: 15 mins: Summer	69.08 4	67.78 0	67.953	0.173	69.7	0.196	0.000	70.9	60.831	OK
15	FEH: 100 years: +0 %: 15 mins: Summer	68.94 2	67.63 6	67.866	0.230	71.7	0.260	0.000	73.4	61.820	OK
16	FEH: 100 years: +0 %: 15 mins: Summer	68.89 5	68.29 5	68.333	0.038	3.3	0.007	0.000	3.2	1.424	OK
14	FEH: 100 years: +0 %: 15 mins: Summer	69.43 2	68.78 2	68.840	0.058	10.5	0.011	0.000	10.5	8.156	OK
17	FEH: 100 years: +0 %: 15 mins: Summer	68.68 9	67.57 4	67.824	0.250	89.7	0.283	0.000	91.5	78.863	OK
20	FEH: 100 years: +0 %: 15 mins: Summer	69.50 0	68.85 0	68.896	0.046	5.2	0.009	0.000	5.3	5.812	OK
21	FEH: 100 years: +0 %: 15 mins: Summer	69.27 3	68.56 5	68.611	0.046	11.9	0.009	0.000	11.7	8.868	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024					
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH			
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park					


23	FEH: 100 years: +0 %: 15 mins: Summer	69.42 3	68.71 8	68.795	0.077	7.0	0.015	0.000	6.8	3.096	OK
22	FEH: 100 years: +0 %: 15 mins: Summer	69.46 5	68.86 5	68.918	0.053	3.3	0.010	0.000	3.2	1.426	OK
19	FEH: 100 years: +0 %: 15 mins: Summer	68.68 2	67.94 8	68.001	0.053	3.8	0.010	0.000	3.5	1.659	OK
18	FEH: 100 years: +0 %: 15 mins: Summer	68.67 9	68.02 9	68.073	0.045	2.7	0.009	0.000	2.7	1.188	OK
24	FEH: 100 years: +0 %: 15 mins: Summer	68.62 9	67.53 2	67.777	0.245	96.6	0.277	0.000	97.7	82.567	OK
25	FEH: 100 years: +0 %: 15 mins: Summer	68.65 0	67.49 0	67.720	0.230	106.1	0.260	0.000	107.4	91.498	OK
26	FEH: 100 years: +0 %: 15 mins: Summer	68.73 8	68.08 8	68.115	0.027	3.8	0.005	0.000	3.8	4.011	OK
27	FEH: 100 years: +0 %: 15 mins: Summer	68.70 7	67.38 7	67.619	0.232	116.7	0.262	0.000	117.9	101.622	OK
35	FEH: 100 years: +0 %: 15 mins: Summer	68.55 6	67.36 0	67.550	0.190	117.9	0.214	0.000	118.5	101.128	OK
28	FEH: 100 years: +0 %: 15 mins: Summer	68.46 4	67.81 4	67.849	0.034	3.9	0.007	0.000	3.8	1.671	OK
34	FEH: 100 years: +0 %: 15 mins: Summer	68.82 8	67.96 4	68.026	0.062	17.3	0.070	0.000	16.8	9.213	OK
32	FEH: 100 years: +0 %: 15 mins: Summer	68.78 2	68.03 2	68.131	0.099	14.2	0.112	0.000	13.4	7.558	OK
31	FEH: 100 years: +0 %: 15 mins: Summer	68.79 9	68.14 9	68.199	0.050	6.9	0.010	0.000	6.7	3.091	OK
30	FEH: 100 years: +0 %: 15 mins: Summer	69.00 5	68.25 3	68.319	0.065	5.4	0.013	0.000	5.3	2.376	OK
33	FEH: 100 years: +0 %: 15 mins: Summer	68.95 3	68.30 3	68.354	0.051	6.5	0.010	0.000	6.3	4.029	OK
29	FEH: 100 years: +0 %: 15 mins: Summer	69.01 9	68.41 9	68.472	0.053	3.3	0.010	0.000	3.2	1.426	OK
36	FEH: 100 years: +0 %: 15 mins: Summer	68.32 4	67.16 0	67.488	0.327	1.2	0.370	0.000	0.8	0.893	Surcharge d
37	FEH: 100 years: +0 %: 15 mins: Summer	68.06 3	66.98 9	67.013	0.023	0.8	0.000	0.000	0.8	0.825	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
3	FEH: 30 years: +45 %: 15 mins: Summer	69.36 4	68.71 4	68.739	0.025	1.8	0.005	0.000	1.7	2.166	OK
2	FEH: 30 years: +45 %: 15 mins: Summer	69.20 2	68.34 4	68.429	0.085	10.5	0.017	0.000	9.7	5.962	OK
1	FEH: 30 years: +45 %: 15 mins: Summer	69.20 3	68.50 3	68.555	0.051	3.8	0.010	0.000	3.7	1.664	OK
6	FEH: 30 years: +45 %: 15 mins: Summer	69.68 4	69.03 4	69.136	0.102	24.6	0.020	0.000	24.0	13.041	OK
5	FEH: 30 years: +45 %: 15 mins: Summer	69.28 3	68.04 0	68.211	0.171	43.1	0.193	0.000	41.0	29.834	OK
4	FEH: 30 years: +45 %: 15 mins: Summer	69.22 7	68.15 7	68.257	0.100	12.9	0.113	0.000	12.4	7.229	OK
7	FEH: 30 years: +45 %: 15 mins: Summer	69.44 7	67.99 0	68.130	0.140	46.6	0.158	0.000	44.9	40.687	OK
8	FEH: 30 years: +45 %: 15 mins: Summer	69.16 4	67.82 5	68.033	0.208	65.2	0.235	0.000	63.2	56.572	OK
10	FEH: 30 years: +45 %: 15 mins: Summer	69.30 3	68.70 3	68.730	0.027	5.1	0.005	0.000	5.0	2.213	OK
9	FEH: 30 years: +45 %: 15 mins: Summer	69.42 3	68.82 3	68.858	0.035	1.9	0.007	0.000	1.9	0.826	OK
12	FEH: 30 years: +45 %: 15 mins: Summer	69.14 2	68.05 0	68.158	0.108	11.5	0.021	0.000	11.8	8.676	OK
11	FEH: 30 years: +45 %: 15 mins: Summer	69.28 8	68.63 8	68.689	0.051	8.7	0.010	0.000	8.5	5.473	OK
13	FEH: 30 years: +45 %: 15 mins: Summer	69.08 4	67.78 0	67.977	0.197	84.2	0.223	0.000	85.6	72.540	OK
15	FEH: 30 years: +45 %: 15 mins: Summer	68.94 2	67.63 6	67.901	0.265	86.5	0.300	0.000	88.5	73.723	OK
16	FEH: 30 years: +45 %: 15 mins: Summer	68.89 5	68.29 5	68.336	0.042	3.8	0.008	0.000	3.8	1.658	OK
14	FEH: 30 years: +45 %: 15 mins: Summer	69.43 2	68.78 2	68.847	0.065	12.7	0.013	0.000	12.8	9.773	OK
17	FEH: 30 years: +45 %: 15 mins: Summer	68.68 9	67.57 4	67.860	0.286	108.6	0.324	0.000	110.6	94.183	OK
20	FEH: 30 years: +45 %: 15 mins: Summer	69.50 0	68.85 0	68.902	0.052	6.6	0.010	0.000	6.7	6.990	OK
21	FEH: 30 years: +45 %: 15 mins: Summer	69.27 3	68.56 5	68.616	0.051	14.1	0.010	0.000	13.7	10.554	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024					
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH			
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park					


23	FEH: 30 years: +45 %: 15 mins: Summer	69.42 3	68.71 8	68.802	0.084	8.2	0.017	0.000	7.9	3.609	OK
22	FEH: 30 years: +45 %: 15 mins: Summer	69.46 5	68.86 5	68.924	0.059	3.8	0.011	0.000	3.7	1.662	OK
19	FEH: 30 years: +45 %: 15 mins: Summer	68.68 2	67.94 8	68.006	0.058	4.4	0.011	0.000	4.2	1.935	OK
18	FEH: 30 years: +45 %: 15 mins: Summer	68.67 9	68.02 9	68.077	0.049	3.2	0.010	0.000	3.1	1.386	OK
24	FEH: 30 years: +45 %: 15 mins: Summer	68.62 9	67.53 2	67.811	0.279	116.8	0.316	0.000	118.1	98.621	OK
25	FEH: 30 years: +45 %: 15 mins: Summer	68.65 0	67.49 0	67.751	0.261	128.6	0.295	0.000	130.0	109.604	OK
26	FEH: 30 years: +45 %: 15 mins: Summer	68.73 8	68.08 8	68.119	0.031	4.9	0.006	0.000	4.9	5.072	OK
27	FEH: 30 years: +45 %: 15 mins: Summer	68.70 7	67.38 7	67.647	0.260	140.8	0.294	0.000	142.0	121.315	OK
35	FEH: 30 years: +45 %: 15 mins: Summer	68.55 6	67.36 0	67.574	0.214	142.0	0.242	0.000	142.5	120.599	OK
28	FEH: 30 years: +45 %: 15 mins: Summer	68.46 4	67.81 4	67.852	0.037	4.5	0.007	0.000	4.4	1.944	OK
34	FEH: 30 years: +45 %: 15 mins: Summer	68.82 8	67.96 4	68.032	0.068	20.4	0.077	0.000	19.9	10.771	OK
32	FEH: 30 years: +45 %: 15 mins: Summer	68.78 2	68.03 2	68.141	0.109	16.8	0.123	0.000	16.0	8.842	OK
31	FEH: 30 years: +45 %: 15 mins: Summer	68.79 9	68.14 9	68.205	0.056	8.1	0.011	0.000	7.9	3.604	OK
30	FEH: 30 years: +45 %: 15 mins: Summer	69.00 5	68.25 3	68.324	0.071	6.3	0.014	0.000	6.1	2.772	OK
33	FEH: 30 years: +45 %: 15 mins: Summer	68.95 3	68.30 3	68.359	0.056	7.7	0.011	0.000	7.6	4.724	OK
29	FEH: 30 years: +45 %: 15 mins: Summer	69.01 9	68.41 9	68.477	0.058	3.8	0.011	0.000	3.7	1.662	OK
36	FEH: 30 years: +45 %: 15 mins: Summer	68.32 4	67.16 0	67.535	0.375	1.5	0.424	0.000	0.8	0.960	Surcharge d
37	FEH: 30 years: +45 %: 15 mins: Summer	68.06 3	66.98 9	67.013	0.024	0.8	0.000	0.000	0.8	0.877	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
3	FEH: 30 years: +0 %: 15 mins: Summer	69.36 4	68.71 4	68.734	0.020	1.2	0.004	0.000	1.1	1.137	OK
2	FEH: 30 years: +0 %: 15 mins: Summer	69.20 2	68.34 4	68.411	0.067	7.2	0.013	0.000	6.6	3.757	OK
1	FEH: 30 years: +0 %: 15 mins: Summer	69.20 3	68.50 3	68.545	0.042	2.6	0.008	0.000	2.5	1.147	OK
6	FEH: 30 years: +0 %: 15 mins: Summer	69.68 4	69.03 4	69.113	0.079	16.5	0.015	0.000	16.1	8.841	OK
5	FEH: 30 years: +0 %: 15 mins: Summer	69.28 3	68.04 0	68.173	0.132	28.3	0.150	0.000	26.8	19.517	OK
4	FEH: 30 years: +0 %: 15 mins: Summer	69.22 7	68.15 7	68.235	0.078	8.8	0.088	0.000	8.4	4.637	OK
7	FEH: 30 years: +0 %: 15 mins: Summer	69.44 7	67.99 0	68.095	0.105	30.0	0.119	0.000	28.8	26.217	OK
8	FEH: 30 years: +0 %: 15 mins: Summer	69.16 4	67.82 5	67.979	0.154	41.1	0.174	0.000	40.1	36.730	OK
10	FEH: 30 years: +0 %: 15 mins: Summer	69.30 3	68.70 3	68.725	0.022	3.5	0.004	0.000	3.4	1.530	OK
9	FEH: 30 years: +0 %: 15 mins: Summer	69.42 3	68.82 3	68.851	0.028	1.3	0.006	0.000	1.3	0.574	OK
12	FEH: 30 years: +0 %: 15 mins: Summer	69.14 2	68.05 0	68.120	0.070	6.9	0.014	0.000	7.2	5.800	OK
11	FEH: 30 years: +0 %: 15 mins: Summer	69.28 8	68.63 8	68.678	0.040	5.5	0.008	0.000	5.4	3.684	OK
13	FEH: 30 years: +0 %: 15 mins: Summer	69.08 4	67.78 0	67.925	0.145	53.1	0.165	0.000	54.1	46.921	OK
15	FEH: 30 years: +0 %: 15 mins: Summer	68.94 2	67.63 6	67.827	0.191	54.8	0.216	0.000	55.9	47.684	OK
16	FEH: 30 years: +0 %: 15 mins: Summer	68.89 5	68.29 5	68.328	0.033	2.6	0.007	0.000	2.6	1.146	OK
14	FEH: 30 years: +0 %: 15 mins: Summer	69.43 2	68.78 2	68.831	0.049	7.8	0.010	0.000	7.8	6.231	OK
17	FEH: 30 years: +0 %: 15 mins: Summer	68.68 9	67.57 4	67.782	0.208	67.8	0.235	0.000	69.1	60.694	OK
20	FEH: 30 years: +0 %: 15 mins: Summer	69.50 0	68.85 0	68.889	0.039	4.1	0.008	0.000	4.0	4.420	OK
21	FEH: 30 years: +0 %: 15 mins: Summer	69.27 3	68.56 5	68.606	0.041	9.4	0.008	0.000	9.2	6.870	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham			Date: 22/02/2024					
Report Details: Type: Junctions Summary Storm Phase: Phase			Designed by: CES	Checked by: MJH	Approved By: MJH			
			Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park					


23	FEH: 30 years: +0 %: 15 mins: Summer	69.42 3	68.71 8	68.786	0.068	5.7	0.013	0.000	5.5	2.483	OK
22	FEH: 30 years: +0 %: 15 mins: Summer	69.46 5	68.86 5	68.912	0.047	2.6	0.009	0.000	2.6	1.147	OK
19	FEH: 30 years: +0 %: 15 mins: Summer	68.68 2	67.94 8	67.995	0.047	3.0	0.009	0.000	2.8	1.335	OK
18	FEH: 30 years: +0 %: 15 mins: Summer	68.67 9	68.02 9	68.068	0.040	2.2	0.008	0.000	2.1	0.954	OK
24	FEH: 30 years: +0 %: 15 mins: Summer	68.62 9	67.53 2	67.736	0.204	73.1	0.231	0.000	73.9	63.529	OK
25	FEH: 30 years: +0 %: 15 mins: Summer	68.65 0	67.49 0	67.683	0.193	79.9	0.218	0.000	80.9	70.100	OK
26	FEH: 30 years: +0 %: 15 mins: Summer	68.73 8	68.08 8	68.111	0.023	2.6	0.004	0.000	2.6	2.787	OK
27	FEH: 30 years: +0 %: 15 mins: Summer	68.70 7	67.38 7	67.584	0.197	88.5	0.222	0.000	89.5	78.281	OK
35	FEH: 30 years: +0 %: 15 mins: Summer	68.55 6	67.36 0	67.521	0.161	89.5	0.182	0.000	90.0	78.037	OK
28	FEH: 30 years: +0 %: 15 mins: Summer	68.46 4	67.81 4	67.845	0.031	3.1	0.006	0.000	3.0	1.341	OK
34	FEH: 30 years: +0 %: 15 mins: Summer	68.82 8	67.96 4	68.019	0.055	13.6	0.062	0.000	13.2	7.365	OK
32	FEH: 30 years: +0 %: 15 mins: Summer	68.78 2	68.03 2	68.119	0.087	11.1	0.099	0.000	10.5	6.033	OK
31	FEH: 30 years: +0 %: 15 mins: Summer	68.79 9	68.14 9	68.191	0.042	5.5	0.008	0.000	5.4	2.479	OK
30	FEH: 30 years: +0 %: 15 mins: Summer	69.00 5	68.25 3	68.311	0.058	4.3	0.011	0.000	4.2	1.908	OK
33	FEH: 30 years: +0 %: 15 mins: Summer	68.95 3	68.30 3	68.347	0.044	5.0	0.009	0.000	4.8	3.204	OK
29	FEH: 30 years: +0 %: 15 mins: Summer	69.01 9	68.41 9	68.465	0.046	2.6	0.009	0.000	2.6	1.147	OK
36	FEH: 30 years: +0 %: 15 mins: Summer	68.32 4	67.16 0	67.429	0.268	1.4	0.304	0.000	0.9	0.815	Surcharge d
37	FEH: 30 years: +0 %: 15 mins: Summer	68.06 3	66.98 9	67.015	0.025	0.9	0.000	0.000	0.9	0.775	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
3	FEH: 2 years: +0 %: 15 mins: Summer	69.36 4	68.71 4	68.727	0.013	0.5	0.003	0.000	0.5	0.332	OK
2	FEH: 2 years: +0 %: 15 mins: Summer	69.20 2	68.34 4	68.386	0.042	3.2	0.008	0.000	2.9	1.513	OK
1	FEH: 2 years: +0 %: 15 mins: Summer	69.20 3	68.50 3	68.531	0.028	1.2	0.006	0.000	1.1	0.511	OK
6	FEH: 2 years: +0 %: 15 mins: Summer	69.68 4	69.03 4	69.083	0.049	7.1	0.010	0.000	6.9	3.734	OK
5	FEH: 2 years: +0 %: 15 mins: Summer	69.28 3	68.04 0	68.122	0.082	11.8	0.093	0.000	11.0	7.613	OK
4	FEH: 2 years: +0 %: 15 mins: Summer	69.22 7	68.15 7	68.206	0.050	3.8	0.056	0.000	3.6	1.926	OK
7	FEH: 2 years: +0 %: 15 mins: Summer	69.44 7	67.99 0	68.050	0.060	11.9	0.068	0.000	11.4	9.631	OK
8	FEH: 2 years: +0 %: 15 mins: Summer	69.16 4	67.82 5	67.911	0.086	16.0	0.097	0.000	14.8	13.695	OK
10	FEH: 2 years: +0 %: 15 mins: Summer	69.30 3	68.70 3	68.718	0.015	1.6	0.003	0.000	1.5	0.684	OK
9	FEH: 2 years: +0 %: 15 mins: Summer	69.42 3	68.82 3	68.842	0.019	0.6	0.004	0.000	0.6	0.256	OK
12	FEH: 2 years: +0 %: 15 mins: Summer	69.14 2	68.05 0	68.089	0.039	2.5	0.008	0.000	2.5	2.305	OK
11	FEH: 2 years: +0 %: 15 mins: Summer	69.28 8	68.63 8	68.663	0.025	2.2	0.005	0.000	2.2	1.514	OK
13	FEH: 2 years: +0 %: 15 mins: Summer	69.08 4	67.78 0	67.853	0.073	17.9	0.083	0.000	18.3	17.110	OK
15	FEH: 2 years: +0 %: 15 mins: Summer	68.94 2	67.63 6	67.736	0.100	18.6	0.113	0.000	19.1	17.385	OK
16	FEH: 2 years: +0 %: 15 mins: Summer	68.89 5	68.29 5	68.316	0.022	1.2	0.004	0.000	1.2	0.511	OK
14	FEH: 2 years: +0 %: 15 mins: Summer	69.43 2	68.78 2	68.807	0.025	2.1	0.005	0.000	2.1	2.088	OK
17	FEH: 2 years: +0 %: 15 mins: Summer	68.68 9	67.57 4	67.683	0.109	23.0	0.123	0.000	23.6	21.831	OK
20	FEH: 2 years: +0 %: 15 mins: Summer	69.50 0	68.85 0	68.874	0.024	1.7	0.005	0.000	1.6	1.432	OK
21	FEH: 2 years: +0 %: 15 mins: Summer	69.27 3	68.56 5	68.592	0.027	4.0	0.005	0.000	3.9	2.528	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham			Date: 22/02/2024					
Report Details: Type: Junctions Summary Storm Phase: Phase			Designed by: CES	Checked by: MJH	Approved By: MJH			
			Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park					


23	FEH: 2 years: +0 %: 15 mins: Summer	69.42 3	68.71 8	68.762	0.044	2.5	0.009	0.000	2.4	1.114	OK
22	FEH: 2 years: +0 %: 15 mins: Summer	69.46 5	68.86 5	68.895	0.030	1.2	0.006	0.000	1.1	0.517	OK
19	FEH: 2 years: +0 %: 15 mins: Summer	68.68 2	67.94 8	67.979	0.031	1.3	0.006	0.000	1.2	0.598	OK
18	FEH: 2 years: +0 %: 15 mins: Summer	68.67 9	68.02 9	68.055	0.026	1.0	0.005	0.000	0.9	0.427	OK
24	FEH: 2 years: +0 %: 15 mins: Summer	68.62 9	67.53 2	67.640	0.109	24.9	0.123	0.000	25.2	22.786	OK
25	FEH: 2 years: +0 %: 15 mins: Summer	68.65 0	67.49 0	67.593	0.103	26.9	0.117	0.000	27.4	24.715	OK
26	FEH: 2 years: +0 %: 15 mins: Summer	68.73 8	68.08 8	68.099	0.011	0.6	0.002	0.000	0.6	0.626	OK
27	FEH: 2 years: +0 %: 15 mins: Summer	68.70 7	67.38 7	67.498	0.111	30.7	0.125	0.000	31.5	28.205	OK
35	FEH: 2 years: +0 %: 15 mins: Summer	68.55 6	67.36 0	67.453	0.093	31.5	0.105	0.000	31.8	28.078	OK
28	FEH: 2 years: +0 %: 15 mins: Summer	68.46 4	67.81 4	67.835	0.021	1.4	0.004	0.000	1.3	0.598	OK
34	FEH: 2 years: +0 %: 15 mins: Summer	68.82 8	67.96 4	68.000	0.036	5.7	0.041	0.000	5.5	3.183	OK
32	FEH: 2 years: +0 %: 15 mins: Summer	68.78 2	68.03 2	68.088	0.056	4.7	0.063	0.000	4.3	2.588	OK
31	FEH: 2 years: +0 %: 15 mins: Summer	68.79 9	68.14 9	68.173	0.024	2.5	0.005	0.000	2.4	1.112	OK
30	FEH: 2 years: +0 %: 15 mins: Summer	69.00 5	68.25 3	68.292	0.039	1.9	0.008	0.000	1.9	0.859	OK
33	FEH: 2 years: +0 %: 15 mins: Summer	68.95 3	68.30 3	68.331	0.028	1.9	0.005	0.000	1.9	1.331	OK
29	FEH: 2 years: +0 %: 15 mins: Summer	69.01 9	68.41 9	68.449	0.030	1.2	0.006	0.000	1.1	0.517	OK
36	FEH: 2 years: +0 %: 15 mins: Summer	68.32 4	67.16 0	67.291	0.130	3.8	0.147	0.000	1.0	0.809	OK
37	FEH: 2 years: +0 %: 15 mins: Summer	68.06 3	66.98 9	67.015	0.026	1.0	0.000	0.000	1.0	0.776	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Detention Basin	FEH: 100 years: +45 %: 2160 mins: Winter	68.193	68.193	0.993	0.993	14.9	644.006	0.000	0.000	1.4	303.829	1.262	OK
PP1	FEH: 100 years: +45 %: 60 mins: Summer	68.964	68.866	0.074	0.067	6.8	5.253	0.000	0.000	3.9	7.756	57.309	OK
PP2	FEH: 100 years: +45 %: 15 mins: Summer	69.428	69.405	0.034	0.030	1.6	0.176	0.000	0.000	1.2	0.662	83.288	OK
PP3	FEH: 100 years: +45 %: 30 mins: Summer	68.849	68.819	0.083	0.081	5.8	1.767	0.000	0.000	5.1	4.824	52.788	OK
PP4	FEH: 100 years: +45 %: 30 mins: Summer	69.317	69.284	0.097	0.092	6.8	2.018	0.000	0.000	6.2	5.733	46.070	OK
PP5	FEH: 100 years: +45 %: 30 mins: Summer	69.165	69.116	0.122	0.131	19.4	8.827	0.000	0.000	10.5	15.064	23.621	OK
PP6	FEH: 100 years: +45 %: 30 mins: Summer	69.013	68.995	0.059	0.065	4.2	1.190	0.000	0.000	3.7	3.503	64.405	OK
PP7	FEH: 100 years: +45 %: 30 mins: Summer	68.983	68.964	0.057	0.062	4.7	1.721	0.000	0.000	3.5	3.814	65.015	OK
PP8	FEH: 100 years: +45 %: 30 mins: Summer	69.231	69.187	0.087	0.108	12.6	5.083	0.000	0.000	7.8	10.061	41.134	OK
PP9	FEH: 100 years: +45 %: 30 mins: Summer	69.416	69.371	0.076	0.097	11.0	4.592	0.000	0.000	6.7	8.698	47.773	OK
PP10	FEH: 100 years: +45 %: 30 mins: Summer	69.569	69.544	0.076	0.088	7.9	2.816	0.000	0.000	5.8	6.419	52.166	OK
PP11	FEH: 100 years: +45 %: 60 mins: Summer	69.329	69.273	0.072	0.098	11.4	6.980	0.000	0.000	6.8	13.331	47.123	OK
PP12	FEH: 100 years: +45 %: 30 mins: Summer	69.389	69.357	0.115	0.107	11.6	4.729	0.000	0.000	7.7	9.305	35.070	OK
PP13	FEH: 100 years: +45 %: 30 mins: Summer	69.377	69.357	0.049	0.053	3.2	0.947	0.000	0.000	2.7	2.604	70.478	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham				Date: 22/02/2024									
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		Designed by: CES	Checked by: MJH	Approved By: MJH							


PP14	FEH: 100 years: +45 %: 15 mins: Summer	68.884	68.872	0.031	0.028	1.6	0.202	0.000	0.000	1.0	0.653	83.598	OK
PP15	FEH: 100 years: +45 %: 30 mins: Summer	68.787	68.774	0.061	0.067	4.7	1.523	0.000	0.000	3.8	3.903	63.306	OK
PP16	FEH: 100 years: +45 %: 30 mins: Summer	69.260	69.232	0.079	0.091	8.9	3.401	0.000	0.000	6.1	7.182	50.520	OK
PP17	FEH: 100 years: +45 %: 30 mins: Summer	69.377	69.338	0.076	0.094	9.4	3.642	0.000	0.000	6.4	7.600	49.528	OK
PP18	FEH: 100 years: +45 %: 30 mins: Summer	69.335	69.285	0.119	0.115	14.7	7.160	0.000	0.000	8.6	11.274	31.630	OK
PP19	FEH: 100 years: +45 %: 30 mins: Summer	68.594	68.572	0.069	0.079	6.3	2.151	0.000	0.000	4.9	5.154	57.315	OK
PP20	FEH: 100 years: +45 %: 60 mins: Summer	68.641	68.602	0.130	0.126	15.9	9.781	0.000	0.000	9.9	18.872	24.545	OK
PP21	FEH: 100 years: +45 %: 30 mins: Summer	68.341	68.302	0.106	0.100	10.5	4.381	0.000	0.000	7.0	8.416	40.326	OK
PP22	FEH: 100 years: +45 %: 30 mins: Summer	68.521	68.485	0.092	0.110	11.0	3.898	0.000	0.000	8.1	9.052	40.844	OK
PP23	FEH: 100 years: +45 %: 60 mins: Summer	68.719	68.645	0.129	0.121	19.6	14.504	0.000	0.000	9.3	22.275	23.223	OK
PP24	FEH: 100 years: +45 %: 30 mins: Summer	68.815	68.796	0.081	0.078	5.3	1.436	0.000	0.000	4.8	4.413	54.549	OK
PP25	FEH: 100 years: +45 %: 30 mins: Summer	68.926	68.906	0.048	0.053	3.2	0.978	0.000	0.000	2.7	2.595	70.746	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Detention Basin	FEH: 100 years: +0 %: 1440 mins: Winter	67.949	67.949	0.749	0.749	14.5	425.634	0.000	0.000	1.2	194.463	34.743	OK
PP1	FEH: 100 years: +0 %: 60 mins: Summer	68.949	68.847	0.060	0.048	4.7	3.937	0.000	0.000	2.3	5.132	68.006	OK
PP2	FEH: 100 years: +0 %: 15 mins: Summer	69.422	69.397	0.027	0.022	1.1	0.135	0.000	0.000	0.7	0.447	87.162	OK
PP3	FEH: 100 years: +0 %: 30 mins: Summer	68.832	68.800	0.066	0.062	4.0	1.383	0.000	0.000	3.4	3.277	63.057	OK
PP4	FEH: 100 years: +0 %: 30 mins: Summer	69.296	69.262	0.076	0.070	4.7	1.576	0.000	0.000	4.1	3.897	57.882	OK
PP5	FEH: 100 years: +0 %: 60 mins: Summer	69.126	69.088	0.083	0.103	11.6	6.513	0.000	0.000	7.3	13.768	43.639	OK
PP6	FEH: 100 years: +0 %: 30 mins: Summer	69.000	68.979	0.045	0.049	2.9	0.922	0.000	0.000	2.4	2.380	72.421	OK
PP7	FEH: 100 years: +0 %: 30 mins: Summer	68.969	68.947	0.043	0.045	3.3	1.295	0.000	0.000	2.1	2.557	73.682	OK
PP8	FEH: 100 years: +0 %: 30 mins: Summer	69.205	69.161	0.061	0.082	8.7	3.785	0.000	0.000	5.2	6.744	56.161	OK
PP9	FEH: 100 years: +0 %: 60 mins: Summer	69.394	69.348	0.054	0.074	6.6	3.477	0.000	0.000	4.5	7.836	60.450	OK
PP10	FEH: 100 years: +0 %: 30 mins: Summer	69.550	69.521	0.057	0.065	5.4	2.113	0.000	0.000	3.7	4.318	64.114	OK
PP11	FEH: 100 years: +0 %: 60 mins: Summer	69.308	69.249	0.051	0.074	7.9	5.253	0.000	0.000	4.4	8.949	60.201	OK
PP12	FEH: 100 years: +0 %: 30 mins: Summer	69.362	69.332	0.088	0.082	8.0	3.542	0.000	0.000	5.2	6.246	51.373	OK
PP13	FEH: 100 years: +0 %: 30 mins: Summer	69.366	69.344	0.038	0.039	2.2	0.732	0.000	0.000	1.7	1.757	77.176	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham				Date: 22/02/2024						
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		Designed by: CES	Checked by: MJH	Approved By: MJH				


PP14	FEH: 100 years: +0 %: 30 mins: Summer	68.878	68.865	0.025	0.021	0.7	0.160	0.000	0.000	0.7	0.602	87.040	OK
PP15	FEH: 100 years: +0 %: 30 mins: Summer	68.773	68.757	0.048	0.049	3.3	1.155	0.000	0.000	2.4	2.639	72.167	OK
PP16	FEH: 100 years: +0 %: 30 mins: Summer	69.239	69.208	0.058	0.067	6.2	2.532	0.000	0.000	3.8	4.823	63.160	OK
PP17	FEH: 100 years: +0 %: 30 mins: Summer	69.356	69.314	0.056	0.070	6.5	2.717	0.000	0.000	4.1	5.102	62.342	OK
PP18	FEH: 100 years: +0 %: 60 mins: Summer	69.303	69.259	0.087	0.088	8.8	5.445	0.000	0.000	5.8	10.330	48.008	OK
PP19	FEH: 100 years: +0 %: 30 mins: Summer	68.577	68.552	0.052	0.058	4.3	1.629	0.000	0.000	3.1	3.482	67.673	OK
PP20	FEH: 100 years: +0 %: 60 mins: Summer	68.606	68.572	0.096	0.096	11.0	7.353	0.000	0.000	6.5	12.741	43.278	OK
PP21	FEH: 100 years: +0 %: 30 mins: Summer	68.317	68.279	0.081	0.077	7.2	3.272	0.000	0.000	4.7	5.634	55.428	OK
PP22	FEH: 100 years: +0 %: 30 mins: Summer	68.495	68.458	0.066	0.083	7.6	2.915	0.000	0.000	5.3	6.115	55.769	OK
PP23	FEH: 100 years: +0 %: 60 mins: Summer	68.683	68.616	0.093	0.091	13.5	10.694	0.000	0.000	6.1	14.901	43.389	OK
PP24	FEH: 100 years: +0 %: 30 mins: Summer	68.799	68.777	0.065	0.059	3.6	1.122	0.000	0.000	3.2	3.000	64.481	OK
PP25	FEH: 100 years: +0 %: 30 mins: Summer	68.915	68.893	0.037	0.039	2.2	0.753	0.000	0.000	1.7	1.748	77.454	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Detention Basin	FEH: 30 years: +45 %: 2160 mins: Winter	68.048	68.048	0.848	0.848	12.2	511.479	0.000	0.000	1.3	282.881	21.581	OK
PP1	FEH: 30 years: +45 %: 60 mins: Summer	68.954	68.854	0.064	0.055	5.4	4.374	0.000	0.000	2.8	5.945	64.454	OK
PP2	FEH: 30 years: +45 %: 15 mins: Summer	69.424	69.400	0.030	0.025	1.3	0.150	0.000	0.000	0.9	0.524	85.682	OK
PP3	FEH: 30 years: +45 %: 30 mins: Summer	68.838	68.807	0.072	0.069	4.6	1.515	0.000	0.000	4.0	3.790	59.532	OK
PP4	FEH: 30 years: +45 %: 30 mins: Summer	69.303	69.270	0.083	0.078	5.4	1.727	0.000	0.000	4.8	4.506	53.850	OK
PP5	FEH: 30 years: +45 %: 30 mins: Summer	69.137	69.098	0.095	0.113	15.4	7.231	0.000	0.000	8.4	11.720	37.432	OK
PP6	FEH: 30 years: +45 %: 30 mins: Summer	69.004	68.984	0.050	0.055	3.3	1.014	0.000	0.000	2.8	2.750	69.663	OK
PP7	FEH: 30 years: +45 %: 30 mins: Summer	68.974	68.953	0.047	0.051	3.8	1.443	0.000	0.000	2.6	2.978	70.671	OK
PP8	FEH: 30 years: +45 %: 15 mins: Summer	69.213	69.169	0.069	0.091	15.4	4.226	0.000	0.000	6.0	4.983	51.059	OK
PP9	FEH: 30 years: +45 %: 30 mins: Summer	69.401	69.356	0.061	0.082	8.7	3.845	0.000	0.000	5.2	6.761	56.266	OK
PP10	FEH: 30 years: +45 %: 30 mins: Summer	69.556	69.529	0.063	0.073	6.2	2.353	0.000	0.000	4.4	5.011	60.038	OK
PP11	FEH: 30 years: +45 %: 60 mins: Summer	69.315	69.257	0.057	0.082	9.0	5.808	0.000	0.000	5.2	10.323	56.001	OK
PP12	FEH: 30 years: +45 %: 30 mins: Summer	69.371	69.341	0.097	0.091	9.2	3.953	0.000	0.000	6.0	7.272	45.723	OK
PP13	FEH: 30 years: +45 %: 30 mins: Summer	69.370	69.348	0.041	0.044	2.5	0.808	0.000	0.000	2.1	2.043	74.812	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham				Date: 22/02/2024							
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		Designed by: CES	Checked by: MJH	Approved By: MJH					


PP14	FEH: 30 years: +45 %: 30 mins: Summer	68.880	68.868	0.027	0.024	0.8	0.174	0.000	0.000	0.8	0.698	85.929	OK
PP15	FEH: 30 years: +45 %: 30 mins: Summer	68.778	68.763	0.053	0.055	3.8	1.283	0.000	0.000	2.9	3.062	69.091	OK
PP16	FEH: 30 years: +45 %: 30 mins: Summer	69.246	69.216	0.065	0.075	7.1	2.829	0.000	0.000	4.5	5.603	58.841	OK
PP17	FEH: 30 years: +45 %: 30 mins: Summer	69.363	69.322	0.062	0.078	7.5	3.032	0.000	0.000	4.8	5.927	57.979	OK
PP18	FEH: 30 years: +45 %: 30 mins: Summer	69.315	69.268	0.099	0.097	11.6	5.997	0.000	0.000	6.7	8.746	42.743	OK
PP19	FEH: 30 years: +45 %: 30 mins: Summer	68.583	68.559	0.058	0.065	5.0	1.809	0.000	0.000	3.7	4.035	64.107	OK
PP20	FEH: 30 years: +45 %: 60 mins: Summer	68.617	68.582	0.106	0.106	12.5	8.122	0.000	0.000	7.6	14.653	37.342	OK
PP21	FEH: 30 years: +45 %: 30 mins: Summer	68.325	68.287	0.090	0.085	8.3	3.658	0.000	0.000	5.5	6.566	50.179	OK
PP22	FEH: 30 years: +45 %: 30 mins: Summer	68.503	68.468	0.074	0.092	8.7	3.246	0.000	0.000	6.2	7.087	50.742	OK
PP23	FEH: 30 years: +45 %: 60 mins: Summer	68.694	68.625	0.104	0.101	15.4	11.916	0.000	0.000	7.1	17.227	36.922	OK
PP24	FEH: 30 years: +45 %: 30 mins: Summer	68.804	68.784	0.071	0.066	4.2	1.231	0.000	0.000	3.7	3.479	61.018	OK
PP25	FEH: 30 years: +45 %: 30 mins: Summer	68.919	68.897	0.041	0.044	2.5	0.833	0.000	0.000	2.0	2.034	75.085	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Detention Basin	FEH: 30 years: +0 %: 1440 mins: Winter	67.842	67.842	0.642	0.642	12.1	338.601	0.000	0.000	1.1	164.321	48.086	OK
PP1	FEH: 30 years: +0 %: 60 mins: Summer	68.942	68.837	0.052	0.038	3.7	3.215	0.000	0.000	1.7	3.901	73.872	OK
PP2	FEH: 30 years: +0 %: 30 mins: Summer	69.418	69.393	0.024	0.018	0.6	0.116	0.000	0.000	0.6	0.476	88.923	OK
PP3	FEH: 30 years: +0 %: 30 mins: Summer	68.823	68.789	0.057	0.051	3.2	1.186	0.000	0.000	2.6	2.567	68.313	OK
PP4	FEH: 30 years: +0 %: 30 mins: Summer	69.286	69.251	0.066	0.059	3.7	1.354	0.000	0.000	3.1	3.055	63.824	OK
PP5	FEH: 30 years: +0 %: 60 mins: Summer	69.110	69.072	0.067	0.087	9.1	5.430	0.000	0.000	5.7	10.704	53.016	OK
PP6	FEH: 30 years: +0 %: 30 mins: Summer	68.993	68.970	0.039	0.041	2.3	0.784	0.000	0.000	1.8	1.861	76.538	OK
PP7	FEH: 30 years: +0 %: 60 mins: Summer	68.962	68.939	0.035	0.037	2.2	1.077	0.000	0.000	1.6	2.629	78.107	OK
PP8	FEH: 30 years: +0 %: 30 mins: Summer	69.193	69.148	0.050	0.069	6.9	3.197	0.000	0.000	4.0	5.226	62.978	OK
PP9	FEH: 30 years: +0 %: 60 mins: Summer	69.384	69.337	0.044	0.062	5.2	2.943	0.000	0.000	3.4	6.095	66.534	OK
PP10	FEH: 30 years: +0 %: 30 mins: Summer	69.540	69.509	0.047	0.053	4.3	1.762	0.000	0.000	2.7	3.359	70.063	OK
PP11	FEH: 30 years: +0 %: 60 mins: Summer	69.299	69.235	0.042	0.060	6.2	4.385	0.000	0.000	3.2	6.902	66.779	OK
PP12	FEH: 30 years: +0 %: 15 mins: Summer	69.344	69.316	0.071	0.066	9.7	2.962	0.000	0.000	3.7	2.987	59.330	OK
PP13	FEH: 30 years: +0 %: 30 mins: Summer	69.360	69.336	0.032	0.032	1.7	0.621	0.000	0.000	1.3	1.370	80.648	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham				Date: 22/02/2024							
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		Designed by: CES	Checked by: MJH	Approved By: MJH					


PP14	FEH: 30 years: +0 %: 30 mins: Summer	68.876	68.862	0.022	0.018	0.6	0.139	0.000	0.000	0.5	0.470	88.705	OK
PP15	FEH: 30 years: +0 %: 30 mins: Summer	68.766	68.748	0.041	0.040	2.6	0.965	0.000	0.000	1.8	2.050	76.736	OK
PP16	FEH: 30 years: +0 %: 30 mins: Summer	69.229	69.197	0.048	0.056	4.9	2.114	0.000	0.000	2.9	3.728	69.239	OK
PP17	FEH: 30 years: +0 %: 30 mins: Summer	69.346	69.303	0.046	0.059	5.2	2.270	0.000	0.000	3.1	3.955	68.535	OK
PP18	FEH: 30 years: +0 %: 60 mins: Summer	69.289	69.243	0.074	0.073	6.9	4.597	0.000	0.000	4.4	8.025	56.111	OK
PP19	FEH: 30 years: +0 %: 30 mins: Summer	68.568	68.541	0.043	0.047	3.4	1.364	0.000	0.000	2.3	2.712	72.924	OK
PP20	FEH: 30 years: +0 %: 60 mins: Summer	68.592	68.554	0.081	0.078	8.7	6.152	0.000	0.000	4.8	9.871	52.539	OK
PP21	FEH: 30 years: +0 %: 30 mins: Summer	68.305	68.266	0.069	0.064	5.7	2.768	0.000	0.000	3.6	4.358	62.293	OK
PP22	FEH: 30 years: +0 %: 30 mins: Summer	68.483	68.444	0.054	0.068	6.0	2.434	0.000	0.000	3.9	4.765	63.064	OK
PP23	FEH: 30 years: +0 %: 60 mins: Summer	68.669	68.598	0.079	0.074	10.6	8.756	0.000	0.000	4.5	11.416	53.648	OK
PP24	FEH: 30 years: +0 %: 30 mins: Summer	68.791	68.767	0.057	0.049	2.9	0.962	0.000	0.000	2.4	2.348	69.532	OK
PP25	FEH: 30 years: +0 %: 30 mins: Summer	68.910	68.885	0.031	0.032	1.7	0.637	0.000	0.000	1.3	1.362	80.929	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham		Date: 22/02/2024		
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: CES	Checked by: MJH	Approved By: MJH
		Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park		



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Detention Basin	FEH: 2 years: +0 %: 960 mins: Winter	67.595	67.595	0.395	0.395	10.0	186.037	0.000	0.000	1.1	87.080	71.477	OK
PP1	FEH: 2 years: +0 %: 180 mins: Summer	68.917	68.819	0.028	0.020	1.1	1.956	0.000	0.000	0.6	3.012	84.102	OK
PP2	FEH: 2 years: +0 %: 30 mins: Summer	69.411	69.385	0.016	0.010	0.3	0.071	0.000	0.000	0.2	0.201	93.253	OK
PP3	FEH: 2 years: +0 %: 15 mins: Summer	68.799	68.762	0.033	0.024	2.2	0.670	0.000	0.000	0.8	0.667	82.108	OK
PP4	FEH: 2 years: +0 %: 15 mins: Summer	69.259	69.221	0.039	0.029	2.6	0.773	0.000	0.000	1.1	0.822	79.352	OK
PP5	FEH: 2 years: +0 %: 120 mins: Summer	69.077	69.031	0.035	0.046	3.3	3.038	0.000	0.000	2.2	6.589	73.712	OK
PP6	FEH: 2 years: +0 %: 60 mins: Summer	68.975	68.949	0.021	0.020	0.9	0.429	0.000	0.000	0.6	1.021	87.171	OK
PP7	FEH: 2 years: +0 %: 120 mins: Summer	68.947	68.921	0.020	0.019	0.8	0.634	0.000	0.000	0.6	1.619	87.116	OK
PP8	FEH: 2 years: +0 %: 120 mins: Summer	69.169	69.116	0.025	0.037	2.2	1.831	0.000	0.000	1.6	4.319	78.795	OK
PP9	FEH: 2 years: +0 %: 120 mins: Summer	69.364	69.307	0.024	0.033	1.9	1.699	0.000	0.000	1.3	3.745	80.674	OK
PP10	FEH: 2 years: +0 %: 120 mins: Summer	69.518	69.484	0.026	0.028	1.4	1.007	0.000	0.000	1.0	2.718	82.903	OK
PP11	FEH: 2 years: +0 %: 120 mins: Summer	69.281	69.206	0.024	0.031	2.2	2.516	0.000	0.000	1.2	4.282	80.943	OK
PP12	FEH: 2 years: +0 %: 120 mins: Summer	69.315	69.286	0.042	0.036	2.0	1.722	0.000	0.000	1.5	3.989	76.359	OK
PP13	FEH: 2 years: +0 %: 60 mins: Summer	69.346	69.320	0.017	0.016	0.7	0.348	0.000	0.000	0.4	0.763	89.143	OK

Project: 29478 Attenuation Rev0 Willisham Barns Willisham				Date: 22/02/2024						
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase				Designed by: CES	Checked by: MJH	Approved By: MJH	Company Address: PDC Engineering Unit T6 & T7 Snetterton Business Park			

PP14	FEH: 2 years: +0 %: 60 mins: Summer	68.868	68.853	0.015	0.009	0.2	0.081	0.000	0.000	0.2	0.269	93.410	OK
PP15	FEH: 2 years: +0 %: 120 mins: Summer	68.750	68.728	0.025	0.020	0.8	0.539	0.000	0.000	0.6	1.635	87.009	OK
PP16	FEH: 2 years: +0 %: 120 mins: Summer	69.208	69.171	0.027	0.030	1.5	1.236	0.000	0.000	1.1	3.070	82.021	OK
PP17	FEH: 2 years: +0 %: 120 mins: Summer	69.325	69.275	0.024	0.031	1.6	1.325	0.000	0.000	1.2	3.255	81.634	OK
PP18	FEH: 2 years: +0 %: 120 mins: Summer	69.257	69.208	0.042	0.038	2.5	2.635	0.000	0.000	1.7	4.955	74.839	OK
PP19	FEH: 2 years: +0 %: 120 mins: Summer	68.548	68.518	0.023	0.025	1.1	0.769	0.000	0.000	0.9	2.190	84.728	OK
PP20	FEH: 2 years: +0 %: 120 mins: Summer	68.559	68.517	0.048	0.041	3.2	3.468	0.000	0.000	1.8	6.133	73.247	OK
PP21	FEH: 2 years: +0 %: 120 mins: Summer	68.273	68.235	0.038	0.033	1.8	1.615	0.000	0.000	1.3	3.601	78.006	OK
PP22	FEH: 2 years: +0 %: 60 mins: Summer	68.457	68.411	0.028	0.036	2.3	1.360	0.000	0.000	1.5	2.638	79.356	OK
PP23	FEH: 2 years: +0 %: 180 mins: Summer	68.634	68.565	0.043	0.041	3.2	5.097	0.000	0.000	1.9	8.872	73.017	OK
PP24	FEH: 2 years: +0 %: 15 mins: Summer	68.769	68.743	0.035	0.025	2.0	0.545	0.000	0.000	0.9	0.654	82.758	OK
PP25	FEH: 2 years: +0 %: 60 mins: Summer	68.896	68.870	0.017	0.016	0.7	0.361	0.000	0.000	0.4	0.759	89.211	OK

APPENDIX B

CONTENTS

Surface Water Maintenance Plan



Surface Water Maintenance Plan
Revision 0

Job No. 29478

Proposed Mixed Use Development
Willisham Hall
Barking Road
Willisham
Suffolk
IP8 4SL

Client: Herin Property Investments LLP

February 2024

REPORT CONTROL SHEET

Client: Herin Property Investments LLP **Job No.:** 29478

Project Name: Proposed Mixed Use Development
 Willisham Hall
 Barking Road
 Willisham
 Suffolk
 IP8 4SL

Issue		
Revision 0	February 2024	Report Prepared by: Chloe Spencer M.Sc, AMIEnvSc Senior Environmental Consultant
		Report Reviewed & Authorised by: Matt Hare B.Sc, CEng, MCIWEM, C.WEM, MICE, MIMechE Director - Infrastructure

CONDITIONS OF INVESTIGATION & REPORTING

This report and its findings should be considered in relation to the terms of the brief and objectives agreed between PDC Engineering and the Client.

PDC Engineering are only able to work with information available at the time when the Surface Water Maintenance Plan is carried out which have been applied to the Surface Water Maintenance Plan in accordance with current best practice. PDC Engineering cannot be held responsible for any subsequent flooding to the development or surrounding area.

The details contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by PDC Engineering has not been independently verified by PDC Engineering, unless otherwise stated in the report.

This report was prepared and provided for the sole and specific use of the client. PDC Engineering shall not be responsible for any use of the report or its contents for any other purpose. Copies of the report to other parties for information should be copied in full but PDC Engineering shall extend no professional liability or warranty to other parties in this connection without written consent. The copyright of this report and other plans and documents prepared by PDC Engineering are owned by them.

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1.0 INTRODUCTION

1.1 Background Information

This Surface Water Maintenance Plan (SWMP) was prepared by PDC Engineering. The report was commissioned by Hollins Architects and Surveyors on behalf of Herin Property Investments LLP.

This has been prepared to address Mid Suffolk District Council's Planning Condition 13 of Planning Application, Reference DC/20/02426, for the erection of eleven dwellings, five commercial B1 (office) space units, a A1/A3 farm shop/cafe, play area, footpath, and associated parking at Willisham Hall, Barking Road, Willisham, Suffolk, IP8 4SL, referred to here within as the site.

1.2 Objectives

This report has been prepared to enable the surface water drainage system to be maintained and operated as intended within the design. It is based upon guidance provided by the CIRIA C753 SuDS Manual as well as information found online at <http://www.susdrain.org/>.

This SWMP is also required by Suffolk County Council to support the planning condition for the proposed development.

2.0 PROPOSED SURFACE WATER DRAINAGE SYSTEM

The surface water drainage system within the site has been designed to contain up to and including the 100 year rainfall event including a 45% allowance for climate change. On-site storage/attenuation has been provided within the SuDS components.

The SuDS system aims to manage rainfall and use landscape features where possible to manage the surface water, this includes:

- Control the flow and volume of water leaving the development.
- Pollution prevention by intercepting silt and cleaning runoff from hard surfaces.

The flood risks to the site have been ascertained within the Flood Risk Assessment and Drainage Strategy undertaken by Create Consulting. in June 2020, as part of the original planning application.

3.0 SUDS DESCRIPTION

During rainfall events surface water runoff from the roofs enters the below ground drainage system via rainwater downpipes. The water is then either discharged into the permeable paved driveways or directly into the pipe network. From here the water travels through the pipe network until it discharges into the attenuation/detention basin in the south-west of the site, where it then outfalls into the ditch to the south-west of the site at a restricted rate.

The runoff from private access roads and drives enters directly into the permeable paving where it is intercepted by the paving drain and conveyed through the pipe network before discharging to the basin.

4.0 MANAGING SUDS

The SuDS have been designed for easy maintenance to comprise:

- Regular day to day care – litter collection, regular gardening to control vegetation growth and checking inlets where water enters the SuDS feature.
- Occasional tasks – checking the SuDS feature and removing any silt that builds up in the SuDS feature.
- Remedial Work – repairing damage where necessary.

5.0 DRAINAGE FEATURES

The following lists the SuDS components and extra features which are found on the site.

- Inlet structures such as rainwater downpipes, gullies and channel drains convey water to the SuDS system.
- Manholes, inspection chambers, and rodding eyes are used on bends or where pipes come together.
- Below ground drainage pipes convey water to the SuDS system.
- Detention basins are designed to attenuate runoff and provide treatment during and after storm events.
- Pervious pavements are porous to allow rain to percolate through the surface into underlying ground or act as storage.
- Drainage channels convey water through the SuDS system.

6.0 SUSTAINABLE DRAINAGE MAINTENANCE SPECIFICATION

All components of the SuDS design should be regularly inspected and maintained, an overview of this is detailed in **Table 6.0.2** below, items highlighted in **Table 6.0.2** below are used on this site. As shown in **Table 6.0.1**, there are various frequencies and types of maintenance tasks.

Required Action	Schedule	Frequency
Routine/regular maintenance	Monthly (for normal care of SuDS)	<ul style="list-style-type: none"> • Litter picking • Grass cutting • Inspection of inlets, outlets and control structures.
Occasional maintenance	Annually (dependent on the design)	<ul style="list-style-type: none"> • Silt control around components • Vegetation management around components <ul style="list-style-type: none"> • Suction sweeping of permeable paving • Silt removal from catchpits, soakaways and cellular storage.
Remedial maintenance	As required (tasks to repair problems due to damage or vandalism)	<ul style="list-style-type: none"> • Inlet/outlet repair • Erosion repairs • Reinstatement of edgings • Reinstatement following pollution • Removal of silt build up.

Table 6.0.1. General Requirements of SuDS Maintenance.

The use of weed-killers, pesticides and de-icing agents should be avoided to prevent chemical pollution.

Protect all below ground drainage through careful selection and placement of hard and soft landscaping.

Operation & Maintenance Activity	SuDS Component	
	Detention Basin	Pervious Pavement
Regular Maintenance		
Inspection	●	●
Litter and debris removal	●	●
Grass cutting	●	○
Weed/ invasive plant control	○	○
Shrub management (including pruning)	○	○
Shoreline vegetation management	○	
Aquatic vegetation management	○	
Occasional Maintenance		
Sediment management*	●	●
Vegetation replacement	○	
Vacuum sweeping & brushing		●
Remedial Maintenance		
Structure rehabilitation/ repair	○	○
Infiltration surface reconditioning		○

● will be required ○ may be required

* Sediment should be collected & managed in pre-treatment systems, upstream of the main device.

Table 6.0.2. Typical key SuDS components operation and maintenance activities.

6.1 Inlet Structure, Inspection Chambers, and Pipe Network

Inlet structures such as rainwater downpipes, road gullies and channel drains, should be free from obstruction at all times to allow free flow through the SuDS.

Inspection chambers and rodding eyes are used on bends or where pipes come together, and allow access and cleaning to the system if necessary.

Table 6.1 below details the required actions, frequencies, and responsibilities of the different elements of maintenance and remedial actions. The below responsibilities will be a combination of the residents and the management company depending upon the location of the particular action.

Schedule	Required Action	Frequency	Responsibility
Regular Maintenance / Inspections	Inspect and identify any areas that are not operating correctly. If required take remedial action.	Monthly for 3 months then annually	Resident & Management Company
	Inspect flow control manhole and check for blockages to grates and outlets.	Monthly and after large storm events	Resident & Management Company
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly	Resident & Management Company
	Maintain vegetation to designed limits within the vicinity of below ground drainage pipes to avoid damage to system.	Monthly, or as required	Resident & Management Company
	Inspect rainwater down pipes, channel drains and road gullies, removing obstructions and silt as necessary. Check there is no physical damage.	Monthly	Resident & Management Company
Occasional Maintenance	Remove silt and leaf build up from manholes, gutters etc.	Annually, or as required,	Resident & Management Company
	Remove sediment from pre-treatment inlet structures and inspection chambers.	Annually, or as required,	Resident & Management Company
	Remove inspection covers and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt.	Annually	Resident & Management Company
	Removal of sediment, oil, grease and floatables from pre-treatment structures.	Half yearly, or as required	Resident & Management Company
Remedial Actions	Replacement of malfunctioning parts.	As required	Resident & Management Company

Schedule	Required Action	Frequency	Responsibility
Remedial Actions	Repair physical damage if necessary.	As required	Resident & Management Company
Monitoring	Inspect inlets and pre-treatment systems for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly	Resident & Management Company
	Undertake inspection after leaf fall in Autumn.	Annually	Resident & Management Company
	Inspect all inlets, outlets and vents to ensure that they are in good condition and operating as designed.	Annually	Resident & Management Company
	Survey inside of pipe runs for sediment build up and remove if necessary.	Every 5 years, or as required	Resident & Management Company
	Check outlet for blockages to ditch outlet.	Quarterly	Resident & Management Company
	Check flow control for blockages.	Quarterly	Resident & Management Company
	Check manholes, gutters etc. for silt and leaf build up.	Annually	Resident & Management Company

Table 6.1 Operation and maintenance activity schedule for inlet structure, inspection chambers, and pipe network.

6.2 Pervious Pavements

Pervious pavement is porous to allow rain to percolate through the surface into underlying ground, therefore must be protected from silt, sand, compost, mulch, etc.

Table 6.2 below details the required actions, frequencies, and responsibilities of the different elements of maintenance and remedial actions. The below responsibilities will be a combination of the residents and the management company depending upon the location of the particular action.

Schedule	Required Action	Frequency	Responsibility
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface).	Annually, after autumn leaf fall, or reduced frequency as required, based on site-specific observations or manufacturer's recommendations of clogging pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment	Resident & Management Company

Schedule	Required Action	Frequency	Responsibility
Occasional Maintenance	Stabilise and mow contributing and adjacent areas.	As required	Resident & Management Company
	Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying.	As required - once per year on less frequently used pavements	Resident & Management Company
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required	Resident & Management Company
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required	Resident & 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)	Resident & Management Company
Monitoring	Initial inspection.	Monthly for three months after installation	Resident & Management Company
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action.	Quarterly, 48 hours after large storm in first six months	Resident & Management Company
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually	Resident & Management Company
	Monitor inspection chambers.	Annually	Resident & Management Company

Table 6.2 Operation and maintenance activity schedule for pervious pavements.

6.3 Detention Basin

The detention basin is designed to attenuate runoff and, where vegetated, provide treatment during, and after storm events.

Table 6.3 below details the required actions, frequencies, and responsibilities of the different elements of maintenance and remedial actions. The below will be the responsibilities of the management company.

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

Table 6.3 Operation and maintenance activity schedule for detention basin.

6.4 Ditch and Ordinary Watercourse

Ditches and Ordinary Watercourses convey water through the environment.

Table 6.4 below details the required actions, frequencies, and responsibilities of the different elements of maintenance and remedial actions. The below will be the responsibilities of the management company.

Schedule	Required Action	Frequency	Responsibility
Regular Maintenance / Inspections	Remove litter and debris.	Monthly, or as required	Management Company
	Cut the grass - to retain grass height within specified design range.	Monthly or as required (August - March).	Management Company
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years).	Monthly at start, then as required.	Management Company
	Inspect inlets, outlets, banksides, structures, pipework, culverts etc. for evidence of blockage and/or physical damage.	Monthly	Management Company
	Inspect water body for signs of poor water quality.	Monthly (May - October)	Management Company
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract).	Annually	Management Company
	Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level.	Annually	Management Company
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies.	Half yearly	Management Company
Occasional Maintenance	Remove sediment from the ditch but maintain the original profile and cross section	With effective pre-treatment, this will only be required rarely, e.g. every 25 - 50 years	Management Company
Remedial Actions	Repair erosion or other damage.	As required	Management Company
	Repair/rehabilitate inlets, outlets and overflows.	As required	Management Company
	Remove and dispose of oils or petrol residues using safe standard practices.	As required	Management Company

Table 6.4 Operation and maintenance activity schedule for ditches and ordinary watercourses.

APPENDIX C

CONTENTS

Preliminary Trial Pit Logs



A F Howland Associates Geotechnical Engineers

Site
Willisham Hall, Willisham, Suffolk, IP8 4SL

Trial Pit Number
CBR01

Excavation Method Machine dug pit (JCB 3CX)	Dimensions 1.50 m L x 0.45 m W x 0.75 m D	Ground Level (mOD) 69.57	Client Herin Property Investments LLP	Job Number 24.017
	Location 606977 E 250658 N	Dates 20/02/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50-0.75	B1		20/02/2024:DRY	69.27	0.30	TOPSOIL (Dark brown clay)		
					0.20	Soft off white slightly sandy very gravelly CLAY Gravel is subangular to subrounded fine to coarse chalk		
					0.25	Stiff light brown mottled grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse flint and chalk		
					0.75	Complete at 0.75m		

Plan 	Remarks 1. Location CAT scanned prior to excavation 2. No groundwater encountered 3. Trial pit remained open and sidewalls stable during excavation. 4. Trial pit backfilled with arisings upon completion.	
		Scale (approx) 1:20



A F Howland Associates
Geotechnical Engineers

Site
Willisham Hall, Willisham, Suffolk, IP8 4SL
Trial Pit Number
CBR02

Excavation Method Hand dug pit	Dimensions 0.50 m L x 0.50 m W x 0.75 m D	Ground Level (mOD) 68.77	Client Herin Property Investments LLP	Job Number 24.017
	Location 606963 E 250609 N	Dates 19/02/2024- 20/02/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50-0.75	B1		19/02/2024:DRY	68.62	(0.15)	TOPSOIL (Dark brown clay)		
					0.15	MADE GROUND (Brown slightly sandy gravelly clay. Gravel is subangular to subrounded fine to coarse chalk, concrete and brick fragments)		
					(0.60)			
				68.02	0.75	Complete at 0.75m		

Plan .	Remarks 1. Location CAT scanned prior to excavation 2. No groundwater encountered 3. Trial pit remained open and sidewalls stable during excavation. 4. Trial pit backfilled with arisings upon completion.	
		Scale (approx) 1:20



A F Howland Associates Geotechnical Engineers

Site
Willisham Hall, Willisham, Suffolk, IP8 4SL

Trial Pit Number
CBR03

Excavation Method Machine dug pit (JCB 3CX)	Dimensions 1.50 m L x 0.45 m W x 0.75 m D	Ground Level (mOD) 68.48	Client Herin Property Investments LLP	Job Number 24.017
	Location 606912 E 250590 N	Dates 20/02/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.40-0.60	B1		20/02/2024:DRY	68.18	(0.30)	TOPSOIL (Dark brown clay)		
					0.30	Stiff light brown slightly gravelly CLAY. Gravel is subangular to subrounded fine chalk		
					(0.30)			
					67.88	0.60	Stiff light brown gravelly CLAY. Gravel is subangular to subrounded fine to medium chalk and flint	
				67.73	0.75	Complete at 0.75m		

Plan 	Remarks 1. Location CAT scanned prior to excavation 2. No groundwater encountered 3. Trial pit remained open and sidewalls stable during excavation. 4. Trial pit backfilled with arisings upon completion.	
		Scale (approx) 1:20

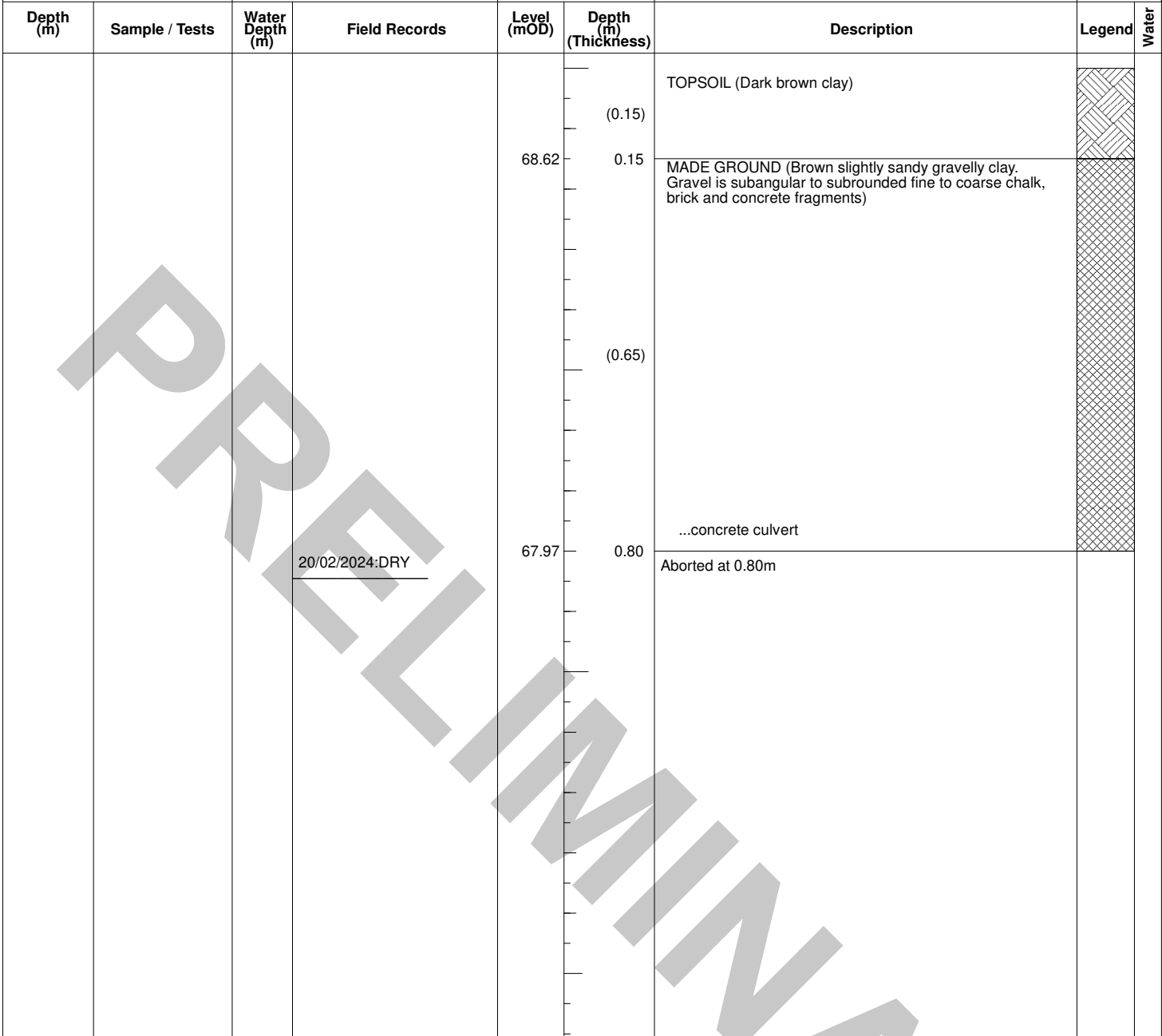


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Site
Willisham Hall, Willisham, Suffolk, IP8 4SL

Trial Pit Number
SA01

Excavation Method Machine dug pit (JCB 3CX)	Dimensions 1.50 m L x 0.45 m W x 0.80 m D	Ground Level (mOD) 68.77	Client Herin Property Investments LLP	Job Number 24.017
	Location 606963 E 250609 N	Dates 20/02/2024	Engineer	Sheet 1/1



Plan .	Remarks 1. Location CAT scanned prior to excavation 2. No groundwater encountered 3. Trial pit remained open and sidewalls stable during excavation. 4. Trial pit aborted due to encountering concrete culvert 5. Trial pit backfilled with arisings 6. Relocated trial pit approx 2.0 m (See SA01A)		
	<table border="1"> <tr> <td>Scale (approx) 1:10</td> <td>Logged By DGWD</td> <td>Figure No. 24.017.SA01</td> </tr> </table>	Scale (approx) 1:10	Logged By DGWD
Scale (approx) 1:10	Logged By DGWD	Figure No. 24.017.SA01	



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Site
Willisham Hall, Willisham, Suffolk, IP8 4SL
Trial Pit Number
SA01A

Excavation Method Machine dug pit (JCB 3CX)	Dimensions 1.50 m L x 0.45 m W x 0.80 m D	Ground Level (mOD) 68.77	Client Herin Property Investments LLP	Job Number 24.017
	Location 606963 E 250609 N	Dates 20/02/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				68.62	(0.15) 0.15	TOPSOIL (Dark brown clay)		
					(0.50)	MADE GROUND (Brown slightly sandy gravelly clay. Gravel is subangular to subrounded fine to coarse chalk, brick and concrete fragments)		
			20/02/2024:DRY	68.12	0.65	...drainage pipe Aborted at 0.65m		



Remarks

1. Location CAT scanned prior to excavation
2. No groundwater encountered
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit aborted due to encountering drainage pipe
5. Trial pit backfilled with arisings
6. Relocated trial pit approx 2.0 m (See SA01B)

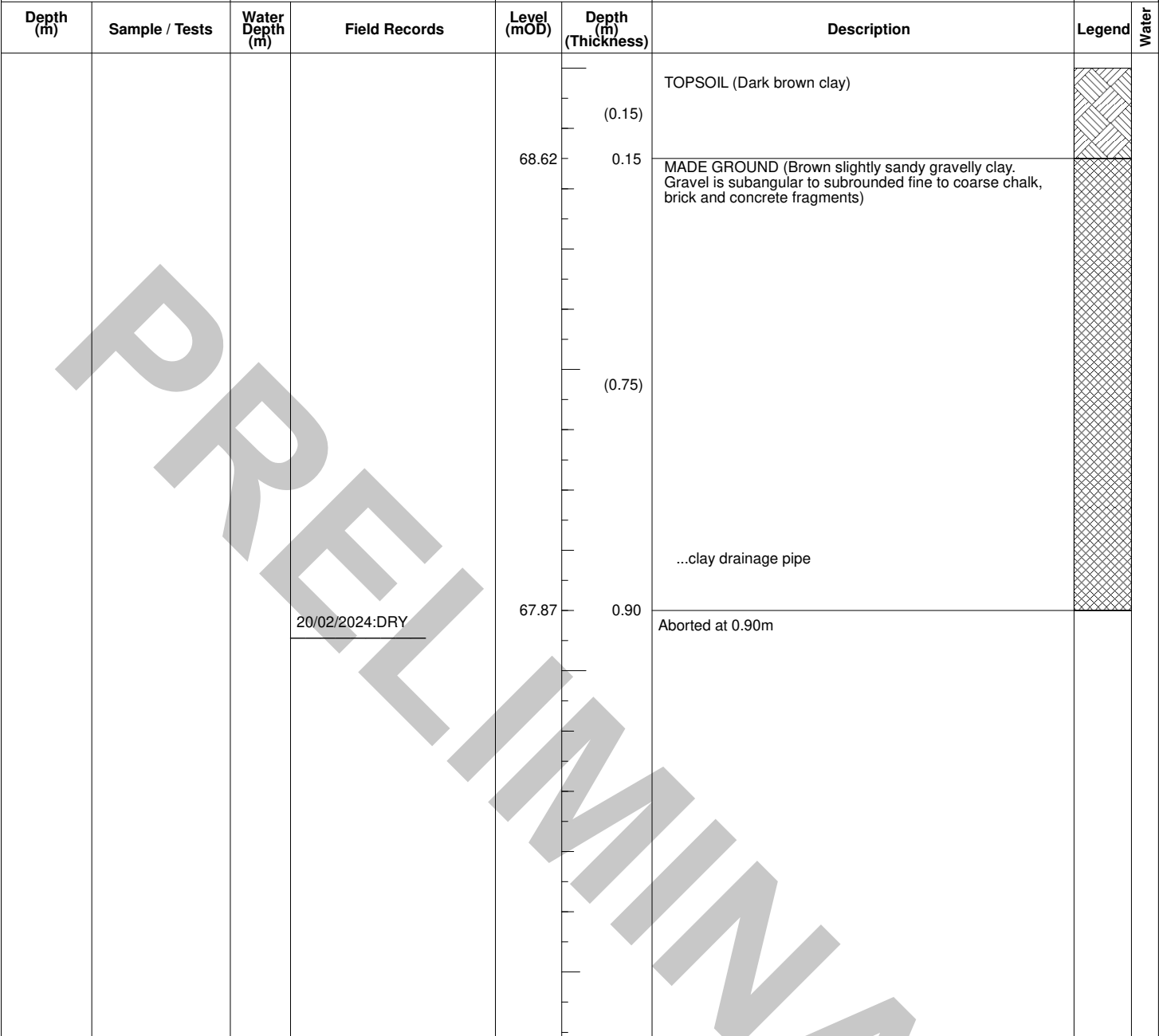
Scale (approx) 1:20	Logged By DGWD	Figure No. 24.017.SA01A
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Geotechnical Engineers

Site
Willisham Hall, Willisham, Suffolk, IP8 4SL
Trial Pit Number
SA01B

Excavation Method Machine dug pit (JCB 3CX)	Dimensions 1.50 m L x 0.45 m W x 0.90 m D	Ground Level (mOD) 68.77	Client Herin Property Investments LLP	Job Number 24.017
	Location 606963 E 250609 N	Dates 20/02/2024	Engineer	Sheet 1/1



Plan .	Remarks 1. Location CAT scanned prior to excavation 2. No groundwater encountered 3. Trial pit remained open and sidewalls stable during excavation. 4. Trial pit aborted due to encountering clay drainage pipe 5. Trial pit backfilled with arisings 6. Relocated trial pit approx 2.0 m (See SA01C)					
	<table border="1"> <tr> <td>Scale (approx)</td> <td>Logged By</td> <td>Figure No.</td> </tr> <tr> <td>1:10</td> <td>DGWD</td> <td>24.017.SA01B</td> </tr> </table>	Scale (approx)	Logged By	Figure No.	1:10	DGWD
Scale (approx)	Logged By	Figure No.				
1:10	DGWD	24.017.SA01B				



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Site
Willisham Hall, Willisham, Suffolk, IP8 4SL
Trial Pit Number
SA01C

Excavation Method Machine dug pit (JCB 3CX)	Dimensions 1.50 m L x 0.45 m W x 1.50 m D	Ground Level (mOD) 68.77	Client Herin Property Investments LLP	Job Number 24.017
	Location 606963 E 250609 N	Dates 20/02/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	D1			68.62	(0.15)	TOPSOIL (Dark brown clay)		
					0.15	Firm light brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse chalk and flint		
			seepage(1) at 1.50m.	67.27	(1.35)			
					1.50	Aborted at 1.50m		∇1

Plan 	Remarks 1. Location CAT scanned prior to excavation 2. Groundwater encountered at 1.5 m 3. Trial pit remained open and sidewalls stable during excavation. 4. Trial pit aborted due to groundwater 5. Trial pit backfilled with arisings.	
		Scale (approx) 1:10



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Site
Willisham Hall, Willisham, Suffolk, IP8 4SL

Trial Pit
Number
SA02

Excavation Method
Machine dug pit
(JCB 3CX)

Dimensions
1.50 m L x 0.45 m W x 2.00 m D

Ground Level (mOD)
68.48

Client
Herin Property Investments LLP

Job
Number
24.017

Location
606912 E 250590 N

Dates
20/02/2024

Engineer

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						TOPSOIL (Dark brown clay)		
				68.18	0.30 (0.30)	Stiff light brown slightly gravelly CLAY. Gravel is subangular to subrounded fine chalk		
				67.88	0.60 (0.70)	Stiff light brown gravelly CLAY. Gravel is subangular to subrounded fine to medium chalk and flint ...with fine to coarse angular to subangular flint gravel		
				67.18	1.30 (0.70)	Stiff light brown mottled grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse chalk		
		20/02/2024:DRY		66.48	2.00	Complete at 2.00m		



Remarks

1. Location CAT scanned prior to excavation
2. Groundwater not encountered during excavation
3. Trial pit remained open and sidewalls stable during excavation.
4. Pit backfilled with gravel to 1.0 m and then arisings to surface
5. Soakage test performed between 1.0 m and 2.0 m
6. Groundwater at 1.64 m on 21/02/2024 prior to test

Scale (approx)	Logged By	Figure No.
1:20	PAS	24.017.SA02



Site : Willisham Hall, Willisham, Suffolk, IP8 4SL

Client : Herin Property Investments LLP

Engineer :

Job Number
24.017

Sheet
1 / 3

Location	Date	Level	Location
SA02	21/02/2024	68.48 mOD	E: 606912 N: 250590

Pit Width (m)	0.45
Pit Depth (m)	2.00
Pit Length (m)	1.50

Soil type at test level	Gravelly CLAY
Groundwater	Groundwater at 1.64 m
Drain discharge depth	Not known
Sidewall stability	Stable, vertical
Stone filled or open pit	Stone filled

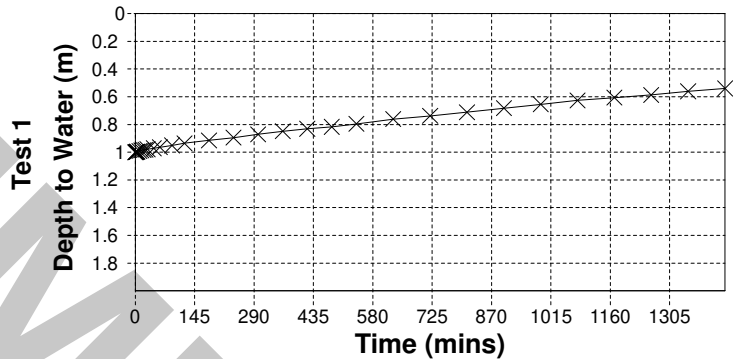
	1
Effective depth (m)	1.00
Volume outflowing between 75% & 25% (m3)*	
Mean surface area through which outflow occurs (m2)	
Time for outflow between 75% & 25% (min)	
SOIL INFILTRATION RATE (ms ⁻¹), f	Test Failed

Remarks

1. Soakage test undertaken between 1.0 m and 2.0 m
2. Groundwater encountered at 1.64 m
3. Datalogger serial no. 12726020
4. Test 1 carried out on 21/02/2024
5. Test failed due to insufficient drainage within 24 hour period
6. Heavy rainfall during test

* Volume outflowing reduced to account for granular backfill used during testing (30 % of free volume assumed).

Elapsed time (mins)	Depth to Water (m) Test 1
0	1.001
1	1.00
2	0.999
3	0.998
4	0.997
5	0.996
10	0.991
15	0.987
20	0.984
25	0.982
30	0.979
45	0.972
60	0.964
90	0.951
120	0.936
180	0.915
240	0.895
300	0.871
360	0.849
420	0.831
480	0.817
540	0.796
630	0.761
720	0.738
810	0.712
900	0.683
990	0.655
1080	0.626
1170	0.606
1260	0.587
1350	0.561
1440	0.54





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Site
Willisham Hall, Willisham, Suffolk, IP8 4SL

Trial Pit Number
SA03

Excavation Method Machine dug pit (JCB 3CX)	Dimensions 1.50 m L x 0.45 m W x 1.20 m D	Ground Level (mOD) 68.46	Client Herin Property Investments LLP	Job Number 24.017
	Location 606924 E 250577 N	Dates 20/02/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						TOPSOIL (Dark brown clay)		
				68.16	0.30	Stiff light brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse chalk		
				67.46	1.00	Stiff light brown mottled grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse chalk and flint		
			20/02/2024:DRY	67.26	1.20	Complete at 1.20m		



Remarks

1. Location CAT scanned prior to excavation
2. No groundwater encountered
3. Trial pit remained open and sidewalls stable during excavation.
4. Pit backfilled with gravel to 0.2 m and then arisings to surface
5. Soakage test performed between 0.2 m and 1.2 m

Scale (approx) 1:20	Logged By PAS	Figure No. 24.017.SA03
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Site : Willisham Hall, Willisham, Suffolk, IP8 4SL

Client : Herin Property Investments LLP

Engineer :

Job Number
24.017

Sheet
2 / 3

Location	Date	Level	Location
SA03	21/02/2024	68.46 mOD	E: 606924 N: 250577

Pit Width (m)	0.45
Pit Depth (m)	1.20
Pit Length (m)	1.50

Soil type at test level	Gravelly CLAY
Groundwater	Not encountered
Drain discharge depth	Not known
Sidewall stability	Stable, vertical
Stone filled or open pit	Stone filled

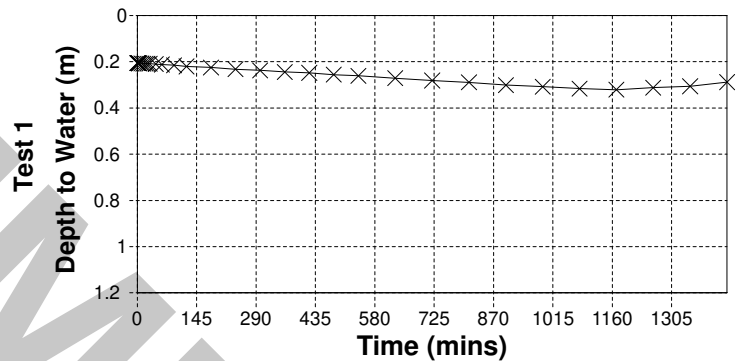
	1
Effective depth (m)	0.99
Volume outflowing between 75% & 25% (m3)*	
Mean surface area through which outflow occurs (m2)	
Time for outflow between 75% & 25% (min)	
SOIL INFILTRATION RATE (ms ⁻¹), f	Test Failed

Remarks

1. Soakage test undertaken between 0.2 m and 1.2 m
2. No groundwater encountered
3. Datalogger serial no. 10109040
4. Test 1 carried out on 20/02/2024
5. Test failed due to insufficient drainage within 24 hour period
6. Heavy rainfall during test

* Volume outflowing reduced to account for granular backfill used during testing (30 % of free volume assumed).

Elapsed time (mins)	Depth to Water (m) Test 1
0	0.206
1	0.206
2	0.206
3	0.206
4	0.207
5	0.207
10	0.207
15	0.208
20	0.208
25	0.208
30	0.208
45	0.21
60	0.212
90	0.215
120	0.22
180	0.225
240	0.232
300	0.237
360	0.244
420	0.248
480	0.256
540	0.261
630	0.271
720	0.281
810	0.289
900	0.301
990	0.308
1080	0.316
1170	0.321
1260	0.312
1350	0.306
1440	0.288





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Site
Willisham Hall, Willisham, Suffolk, IP8 4SL

Trial Pit
Number
SA04

Excavation Method
Machine dug pit
(JCB 3CX)

Dimensions
1.50 m L x 0.45 m W x 2.00 m D

Ground Level (mOD)
67.92

Client
Herin Property Investments LLP

Job
Number
24.017

Location
606933 E 250563 N

Dates
20/02/2024

Engineer

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						TOPSOIL (Dark brown clay)		
				67.52	0.40 (0.20)	Off white silty sandy GRAVEL. Gravel is subangular to subrounded fine to coarse chalk		
				67.32	0.60 (0.60)	Stiff light brown mottled grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse flint and chalk		
				66.72	1.20 (0.80)	Stiff light grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse chalk		
		20/02/2024:DRY		65.92	2.00	Complete at 2.00m		



Remarks

1. Location CAT scanned prior to excavation
2. Groundwater not encountered during excavation
3. Trial pit remained open and sidewalls stable during excavation.
4. Pit backfilled with gravel to 1.0 m and then arisings to surface
5. Soakage test performed between 1.0 m and 2.0 m
6. Groundwater at 1.64 m on 21/02/2024 prior to test

Scale (approx)	Logged By	Figure No.
1:20	PAS	24.017.SA04



Site : Willisham Hall, Willisham, Suffolk, IP8 4SL

Client : Herin Property Investments LLP

Engineer :

Job Number
24.017

Sheet
3 / 3

Location	Date	Level	Location
SA04	21/02/2024	67.92 mOD	E: 606933 N: 250563

Pit Width (m)	0.45
Pit Depth (m)	2.00
Pit Length (m)	1.50

Soil type at test level	Gravelly CLAY
Groundwater	Groundwater at 1.70 m
Drain discharge depth	Not known
Sidewall stability	Stable, vertical
Stone filled or open pit	Stone filled

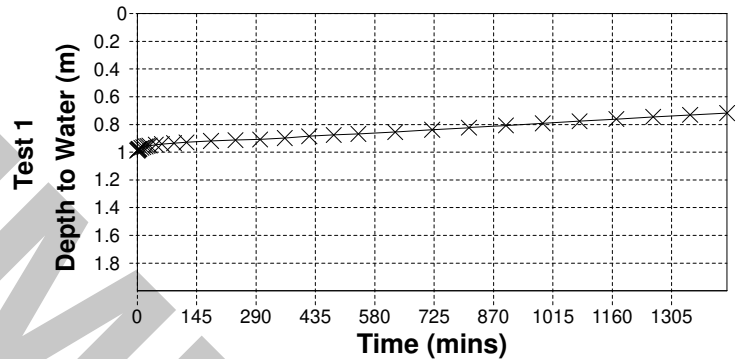
	1
Effective depth (m)	1.01
Volume outflowing between 75% & 25% (m3)*	
Mean surface area through which outflow occurs (m2)	
Time for outflow between 75% & 25% (min)	
SOIL INFILTRATION RATE (ms ⁻¹), f	Test Failed

Remarks

1. Soakage test undertaken between 1.0 m and 2.0 m
2. Groundwater encountered at 1.70 m
3. Datalogger serial no. 10226030
4. Test 1 carried out on 21/02/2024
5. Test failed due to insufficient drainage within 24 hour period
6. Heavy rainfall during test

* Volume outflowing reduced to account for granular backfill used during testing (30 % of free volume assumed).

Elapsed time (mins)	Depth to Water (m) Test 1
0	0.99
1	0.987
2	0.983
3	0.98
4	0.978
5	0.976
10	0.968
15	0.963
20	0.958
25	0.954
30	0.953
45	0.946
60	0.941
90	0.935
120	0.929
180	0.919
240	0.913
300	0.908
360	0.898
420	0.885
480	0.876
540	0.868
630	0.855
720	0.838
810	0.823
900	0.807
990	0.792
1080	0.776
1170	0.761
1260	0.745
1350	0.731
1440	0.718





A F Howland Associates Geotechnical Engineers

Site
Willisham Hall, Willisham, Suffolk, IP8 4SL

Trial Pit Number
TP01

Excavation Method Machine dug pit (JCB 3CX)	Dimensions 1.80 m L x 0.45 m W x 3.00 m D	Ground Level (mOD) 69.57	Client Herin Property Investments LLP	Job Number 24.017
	Location 606977 E 250658 N	Dates 20/02/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D1			69.27	0.30 (0.30)	TOPSOIL (Dark brown clay)		
0.50	D2			69.07	0.20 (0.20)	Soft off white slightly sandy very gravelly CLAY Gravel is subangular to subrounded fine to coarse chalk		
1.00	D3				0.90 (0.90)	Stiff light brown mottled grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse flint and chalk		
2.00	D4		seepage(1) at 1.90m.	68.17	1.40 (1.40)	Stiff light grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse flint and chalk		∇1
				66.57	3.00 (1.60)	Complete at 3.00m		



Remarks

1. Location CAT scanned prior to excavation
2. Groundwater seepage at 1.90 m
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx) 1:20	Logged By PAS	Figure No. 24.017.TP01
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A F Howland Associates
Geotechnical Engineers

Site
Willisham Hall, Willisham, Suffolk, IP8 4SL

Trial Pit Number
TP02

Excavation Method Machine dug pit (JCB 3CX)	Dimensions 1.80 m L x 0.45 m W x 3.00 m D	Ground Level (mOD) 67.38	Client Herin Property Investments LLP	Job Number 24.017
	Location 606936 E 250544 N	Dates 20/02/2024	Engineer	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D1			67.08	(0.30)	TOPSOIL (Dark brown clay)		
					0.30	Stiff light brown gravelly CLAY. Gravel is subangular to subrounded fine to coarse chalk		
1.00	D2			66.18	(0.90)			
					1.20	Stiff light brown mottled grey gravelly CLAY Gravel is subangular to subrounded fine to coarse chalk		
					(1.60)			
2.50	D3			64.58	2.80	Very stiff dark grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse chalk		
					(0.20)			
3.00	D4		20/02/2024: DRY	64.38	3.00	Complete at 3.00m		



Remarks




1. Location CAT scanned prior to excavation
2. No groundwater encountered
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx) 1:20	Logged By PAS	Figure No. 24.017.TP02
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North

Key:

-  Trial pit location and reference
-  Soakaway test location and reference
-  CBR sample location and reference

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Rev	Date	Revision Description	Drwn	Chkd

Rev	Date	Revision Description	Drwn	Chkd

 **A F Howland Associates**
Geotechnical Engineers

A F Howland Associates Ltd
The Old Exchange
Newmarket Road
Cringford
Norwich
NR4 6UF
Tel: 01603 250754
web: www.howland.co.uk
mail: admin@howland.co.uk

Client: Herin Property Investments LLP

Site:
Willisham Hall, Willisham, Suffolk, IP8 4SL

Job No.: 24.017

Drawing Title:
EXPLORATORY HOLE LOCATION PLAN

Date: February 2024

Drawing No: 24.017/02

Scale: 1:800 @ A4



Civil engineering and building

- Industrial, Commercial, Agricultural and Domestic building design
- Foundation Design and ground improvements
- Highway Engineering including Civil 3D
- Retaining walls
- Sheet Piling
- Infrastructure planning and design
- Design of sustainable drainage system (SUDS)
- Soakaway design
- Architectural design of industrial buildings
- Planning and building regulation applications
- 3D conceptual models
- Renewable Energy Civil Engineering design and project management
- Anaerobic Digestion and Waste to Energy Project design and detail



Environmental engineering

- Contaminated Land reports
- Environmental impact assessments (EIA)
- Flood Risk Assessments
- Water supply, treatment, storage and distribution
- Foul and surface water & effluent/leachate drainage design
- Drainage network modelling
- 1D & 2D flood modelling
- Hydraulic river modelling
- Flood Alleviation
- Breach & overtopping analysis
- Reservoir flood inundation modelling
- Consent to discharge applications
- Environmental Permits
- Nutrient Neutrality



Structural engineering

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- Structural design using steel, stainless & carbon steel, concrete, timber and masonry
- Maritime and Hydraulic structures
- Structural surveys and structural suitability surveys
- Structural failure studies
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- 3D Finite Element Analysis
- Structural monitoring
- Structural enhancement/remedial work
- Historic building advice
- 3D Revit & Level 2 BIM structural design & modelling



Surveying land and buildings

- Geomatic / topographical site surveys
- Building, Road, and Earthworks Setting out
- Engineering Setting out
- Establish precise site survey control
- 3D digital terrain modelling
- Volumetric analysis
- Site area computations
- Flood risk surveys using GPS active network
- Measured building floor plans and elevation surveys
- Land transfer plans to Land Registry requirements
- Drainage network surveys
- Assistance/Expert witness in land boundary disputes
- Deterioration monitoring
- Preparation of asset plans
- As built record surveys

PDC Engineering

Units T6 & T7, Snetterton Business Park,
Harling Road, Snetterton, NR16 2JU

t: 01953 452001

e: pdc@pdcengineering.co.uk

pdcengineering.co.uk

PDC Engineering is a trading name of Plandescil Limited whose registered company number is 01447113 and whose registered office is Units T6 & T7, Snetterton Business Park, Harling Road, Snetterton, NR16 2JU.