LUTRA CONSULTANCY

Drainage Strategy Report (DSR) For:

Tre-Gwyr Junior School,
Mount Road,
Gowerton,
Swansea,
SA4 3DR

Prepared for: Squirrel Wood Properties

January 2026

LUTRA CONSULTANCY
www.lutraconsultancy.co.uk
30 Trenos Place, Bryncae,
Llanharan, CF72 9RX
Registered Companies House Number: 14765428

Document Control

Project	**Gowerton**
Client	**Squirrel Wood Properties**
Ref:	**DSR – 26007**

Document Checking:

Prepared By: J Wall	**Signed:** 
Checked By: P Hunt	**Signed:**
Approved By: J Saunders	**Signed:**

Issue	Date	Status
01	02/02/2026	First issue

Contents

Appendices

1 LIMITATIONS

The DSR is prepared in support of a planning application and is for exclusive benefit of The Client. It may not be assigned to or relied upon by third party without agreement in writing.

All comments and proposals contained in this report, including any conclusions, are based on information available during investigations. The conclusions drawn below, could therefore differ if the information is found to be inaccurate or misleading. Lutra Consultancy accepts no liability should this be the case, nor if additional information exists or becomes available with respect to this scheme.

Except as otherwise requested by the client, Lutra Consultancy is not obliged to and disclaims any obligation to update the report for events taking place after: -

The date on which this assessment was undertaken, and the date on which the final report is delivered.

The information presented and conclusions drawn are based on statistical data and are for guidance purposes only. The study provides no guarantee against flooding of the study site or elsewhere, nor of the absolute accuracy of water levels, flow rates and associated probabilities.

1.1 Purpose of the Report

The purpose of this report is to derive a drainage strategy in line with the current Sustainable Drainage System (SuDS) guidance to support a SuDS Approval Body (SAB) application.

1.2 Relevant Documents

The DSR has been informed by the following documents:

- Welsh Government – Sustainable Drainage (SuDS) Statutory Guidance. (*ISBN: 978-1-78964-618-4*)
- Welsh Government Advice Note – SAB applications for single dwellings, extensions, and parking and access areas (July 2022). (*ISBN: 978-1-80364-492-9*)
- CIRIA Report C753 – The SuDS Manual 2015
- BRE Digest 365 – Soakaway Design
- Sewers for Adoption – A Design and Construction Guide for Developers – Eight edition – August 2018

2 INTRODUCTION

Lutra Consultancy has been instructed by The Client, to undertake a DSR in support of a SAB application for the proposed renovation of Tre-Gwyr Junior School, Mount Street, Gowerton, Swansea, SA4 3DR.

Easting 258661 Northings: 196178

The existing brownfield site was previously a Junior's a school. The entirety of the plot has been built over with a bituminous surface surrounding the existing building.

Refer to Existing Site Plan, Appendix A.

2.1 Site Location

The site is set off Mount Road on the outskirts of the residential area east of Gowerton. 640m to the east is Gowerton train station and 1km north of the site is the A484 which follows the Afon Lliw. Refer to Figure 1.

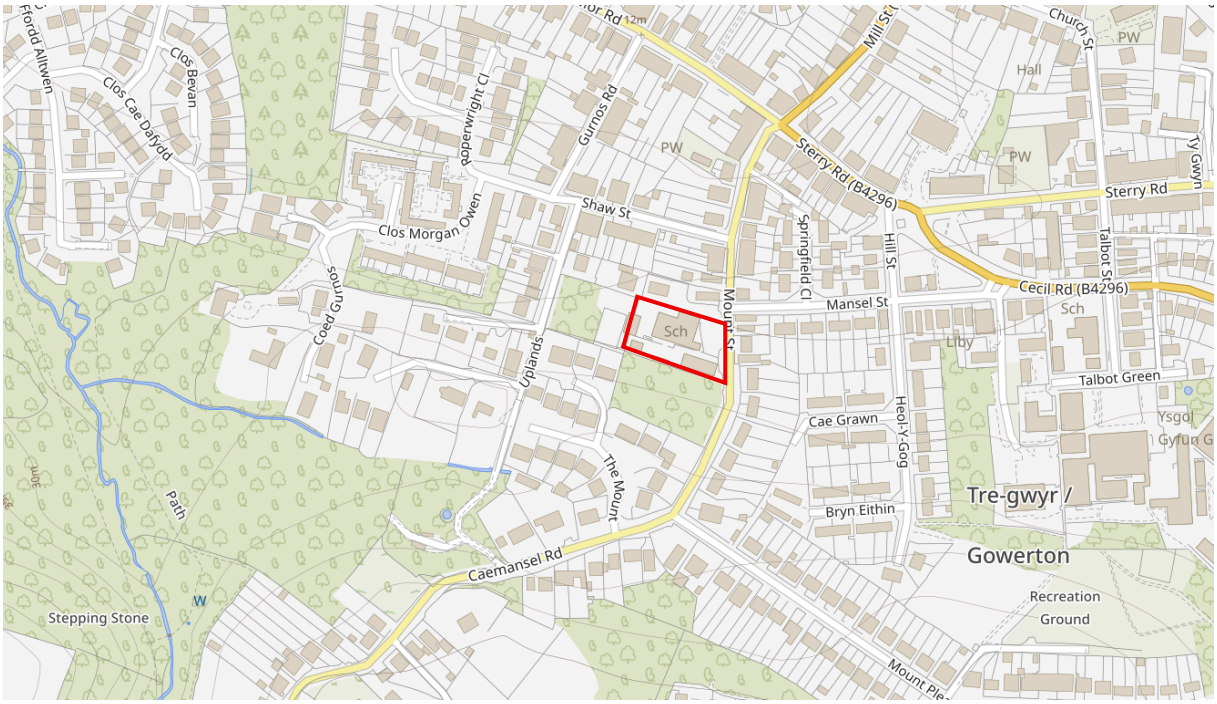


Figure 1: Site Location Satellite Plan

2.2 Proposed Development

It is proposed that the existing buildings are renovated into a care home with self-contained apartments and communal spaces. Externally improvements to the landscaping will be added to create aesthetically pleasing space for residents.

Refer to Appendix A & B.

2.3 Existing Topography

A topographical survey was completed by Vinci Surveys to a local grid unknown grid. This survey was performed on 20/07.20. Refer to Appendix A.

The survey found the site to be split over two relatively levels area created via a number of retaining walls surrounding the site. The survey shows levels along Mount Road falling from south to north with a typical gradient of 1 in 10. The southern third of the site is elevated above the rest by approximately 1.2m.

2.4 Existing Geology

From review of the British Geological Survey Online Geology Viewer maps the existing soils are classified as:

Existing Geology	
Substrate	Type
Superficial Soil	None Records
Bedrock	Swansea Member – Mudstone, Siltstone and Sandstone.

Borehole logs were also reviewed, and none were found on site. A few logs were records to the east and west of the site but are not publicly available. Refer to Appendix F.

Infiltration testing was not safe to undertake on site with no location over 5m from any existing structure. Due to the density of construction on site and the retaining walls surrounding the property, infiltration was not considered appropriate.

2.5 Existing Site Drainage

Drw Cymru Welsh Water (DCWW) local records show a combined and surface water sewer within the Mount Road.

A CCTV survey by Draintech was undertaken to locate the private drainage on site. The survey found a combined network running from west to east where it joined the DCWW network within Mount Road. Additionally, the CCTV survey located the surface water sewer within Mount Road and found this to not pass through the site.

Refer to Appendix A & B for Existing Drainage Plans

2.6 Flood Risk

National Resources Wales (NRW) flood risk maps for planning show the site to be in Zone 1 which is considered the lowest risk of flooding for planning assessments.

The site is outside of any Surface Water Flood flooding areas. Mouth Road is shown to have a high risk of flooding which means access to the site might be limited and safe refuge should be offered on site.

Refer to Appendix D for NRW flood maps.

3 SUSTAINABLE DRAINAGE SYSTEMS (SuDS)

The principles listed below underpin the design of surface water management schemes to meet the Statutory National Standards for SuDS for Wales.

It is proposed that the existing building is renovated into a care home accommodation and as such much of the external areas will also be renovated to incorporate soft landscaping, improving the aesthetic of the site. The existing combined drainage network will be separated into a foul and surface water systems to join the respective local networks, with a DCWW public surface water and combined system located in Mount Road. All SuDS systems will be sympathetic to the restricted space available on site both above and below ground whilst also improving on the 4 pillars of the SuDS manual.

Infiltration on site is not safe due to the dense level of construction, neither shallow of point of source infiltration can be safely located away from all the structures. As such it is proposed that the surface water is redirected into the surface water sewer running along the eastern boundary of the site. Discharge will be restricted to 15l/s which is a considerable improvement on the existing site run of rate, but also considerate of the limited space and cost which further restrictions would impose on the site.

To help with interception and treating water as close to the source multiple SuDS systems will be placed around the site, with permeable paving and rain gardens located around the site. Meeting interception on site is not however possible due to the vast area of construction and limited ability for infiltration to be utilised.

A causeway flow model has been used to ensure that the system can accommodate up to 1 in 100 years plus 40% climate change plus 10% urban creep. Should storm water exceed this event or the system become neglected then flood water will be controlled with the permeable paving and rain gardens away from doors and footways. Water beyond this level would then flow along the driveway before joining the Mount Road as per the existing exceedance flow routes.

A new landscaping scheme has been proposed will improve the biodiversity and the amenity on site. As such the SuDS features have only proposed minor additions to this to avoid planning issues. To protect the existing structure the GreenBlue Urban Hydroplanter systems have been proposed.

The new private development will greatly improve the aesthetics and biodiversity following years of neglect on site using systems that are considered of cost, construction and lifetime maintenance. As such wherever possible, drainage has been made easily accessible and shallow with basic maintenance requirements. Only the attenuation tanks and flow control units will be deep and require specialist training to maintain or repair.

3.1 Standard S1 – Surface water runoff destination

The following receptors have been considered for surface water runoff on site, in order of SuDS preference.

1. Priority Level 1: Collection for reuse.
2. Priority Level 2: Infiltration into ground
3. Priority Level 3: Discharge into open surface water body
4. Priority Level 4: Discharge into surface water sewer, highway drain, or another drainage system
5. Priority Level 5: Discharge to a combined sewer.

3.1.1 Priority Level 1 - Surface water collected for use:

Water will first be used to water the rain gardens.

Rainwater harvesting for the proposed property have been considered as too costly to implement. Which multiple units spread out within the building and only limited use for grey water in toilets the installation cost and maintenance alone would outweigh the potential benefits in cost savings especially given the sites urban location where water pressure is not considered to be an issue.

Additionally, the residents of the property are likely to be higher risk individuals and reducing the risk of flooding or prevention of access to vital facilities is a top priority. Complicating this with double stacked plumbing could result in accidents in the buildings.

Move to next priority level.

3.1.2 Priority Level 2 – Discharge via infiltration:

The site is densely built up with retaining walls all around as well as separating the site down the middle. When the extension is added to the existing building there are no safe location for any form of infiltration. The period nature of the existing structure is also not considered to have been built with this risk in mind and heave in the soils could result in structural movement.

To protect the existing structures, reputable drainage systems have been chosen with clear instruction installation and reliable tanking methods.

Move to next priority level.

3.1.3 Priority Level 3 – Discharge via open body of surface water:

No open body of water passes in close proximity to the site.

Move to next priority level.

3.1.4 Priority Level 3 – Discharge via surface water sewer:

The public surface water sewer in Mounts Road is shown by DCWW records to pass through the site. The exact location of this sewer should be confirmed however it is close proximity and at a depth which a gravity connection can be achieved.

Therefore, the site will seek to join this public network to reduce the onus on the combined sewer.

3.2 Standard S2 – Surface water runoff hydraulic Control

3.2.1 Greenfield runoff:

Greenfield run off rates using the FEH method for the site have been determined by use of the HR Wallingford online tools for an area of 0.30ha, which determine Q_{bar} = 3.7 l/s. Refer to Appendix C.

3.2.2 Discharge rate:

The existing site (3025m^2) is completely impermeable which drains to the public combined network.

Using the Building Regulation Part H2 Diagram 1 we can determine a typical discharge rate for a 5min storm event which the site would currently produce.

0.016 litre/second/m^2 x 3025m^2 = 48.4 l/s

The proposed site looks to relocated surface water to the surface water sewer which is not considered to be receiving flows from the site and therefore allowance in the network is subject to DCWW approval. Should a surface water connection not be possible then a new connection onto the combined sewer will be required.

Improvements to the discharge rate should be sought to compensate for climate change factors as such a minimum improvement of 30% is required, however further reduction in the discharge rate should be made wherever possible. Therefore, a balance between discharge rates and attenuation on site needs to be considered, as well as the cost implications, maintenance and risk management. With this in mind a discharge rate of 15l/s will be proposed which is a betterment of 70%, subject to DCWW approval.

A Hydrobrake optimum vortex flow control will be used to ensure a consistent discharge. Set to a design head of 1.8m with a bypass door. Refence number: SHE-0163-1500-1800-1500. This will help to reduce blockages and maintenance intervals which is a priority on the site which will house highly vulnerable residents.

3.2.3 Attenuation systems:

Attenuation on site will be provided SuDS train of rain gardens, permeable paving and geocellular tanks. These systems will reduce the runoff rates and ensure that flooding does not occur locally while also minimising the risk of blockages.

A Causeway Flow model for the site has been created to ensure the site can infiltrate safely all storm events, with minimal surcharging in any SuDS features for a 1 in 2 year storm event, no flood risk for a 1 in 30 year storm and no flooding for a 1 in 100 year storm. All simulation have 40% climate change and an additional 10% Urban Creep applied to them. Results from the modelling can be seen in Appendix C.

The localised flooding for the 100 years events in the raingardens along the western boundary of the site was repeatedly found. To prevent this risk a secondary flow control and attenuation tank was added to control the rates of discharge. This small tank with orifice plate chamber will be set within the soft landscaping and will be with Wavin Aquacell ECO and a turtle Oriflo chamber.

Within the parking at the east of the site most of the attenuation will be located in an area where machinery can access the system for washing or repairs. Additional this will ensure in the extreme

events, exceedance flows run towards Mount Road and away from the site. Due to the increased loading proposed over the tank, Wavin Aquacell Core-R units will be used and set to a suitable cover of at least 0.6m.

The attenuation tank will be designed to attenuate storm events up to 1 in 30 years plus climate change after which water will be stored in the rain gardens and permeable paving.

Storm events up to 1 in 200 years plus climate change where also modelled to understand where flooding might occur on site. Result found water pooling in the rain gardens and by the site entrance. The level of flooding is likely to results in only a low level of pooling less than 10mm deep.

3.2.4 Interception:

The existing brownfield site does not meet interception and joins the local combined network with an impermeable area of approximately 3025m^2.

The new development will improve this via the reduction in impermeable area of **628m²** which is approximately 20% less. Additionally, rain gardens will be added as well as permeable paving however there is insufficient space for systems large enough to provide adequate interception, without the improvements which partial infiltration can offer. As such it is not possible to meet interception for the whole site as set out in the Welsh Government Statutory Standards for Sustainable Drainage Systems Standards (SDSS) for Wales, Table G2.1 and section G2.11-2.16.

The improvements to interception are listed below. Refer to table 2 below.

INTERCEPTION SYSTEMS REVIEW							
Provided					Required		
System	Area (m²)	Lining	Factor	Area provided (m²)	System	Area (m²)	
Permeable paving	109	lined	2	218	Parking	456	Insufficient
Rain Garden	55	lined	5	275	Building	1939	Insufficient
			Total	493	Total	2395	Insufficient

Table 1: Interception Systems Review table.

3.2.5 Factor of Safety:

Factor of safety has been applied to the SuDS systems as per the Statutory Standards for SuDS Table G1.1 where the consequences for failure are considered a

- '*No damage or inconvenience'* for rain gardens set in the soft landscaping: 1.5 Factor
- '*Minor inconvenience* 'as water will pool within the parking area: 3.0 Factor

3.2.6 Exceedance flows:

Should the system fall into neglect, become blocked or experience more extreme storm events than it is necessary to design for, water will pool within the permeable paving to the east of the site before running into Mount Road, following existing flow direction. Refer to **Appendix B**, catchment plan

3.3 Standard S3 – Water Quality

The development will ensure water quality via the permeable paving, rain gardens and proprietary treatment systems in line with CIRIA 753 guidance set out in Chapter 26, using tables 26.2, 26.3 & 26.4

As set out in the Welsh Government SDSS for Wales, Table G3.1 the residential roof will have a very low pollution hazard which does not need to meet the simple index approach but must have solids removed. Rainwater pipes will discharge into rain gardens wherever possible, where this is not possible ACO channel and yard gullies will be used with sump pots to remove solids.

Since the system is sealed the issue of silt and litter entering the attention systems will be less impactful over the lifetime of the network. They will be a risk of blockages to the flow control so bypass doors and sumps will be added at these locations to allow for quick flood relief.

Refer to Table 1 below.

SIMPLE INDEX APPROACH									
Hazard Indices					Mitigation Indices				
Land Use	Risk	TSS	Metals	Hydro carbons	System (Table 26.3)	TSS	Metal	Hydro carbons	
Parking	Low	0.5	0.4	0.4	Permeable Paving	0.7	0.6	0.7	Okay
Driveway	Low	0.5	0.4	0.4	Rain Garden	0.8	0.8	0.8	Okay

Table 1: Water Quality Indices comparison.

3.4 Standard S4 – Amenity

The development seeks to create communal areas which are safe, easily accessible and aesthetically pleasing for the residents. Because of this, large external areas are replacing the bituminous surfaces for soft landscaping. To tie into this rain gardens will be used to ensure that water is directed towards the planting in the first instance.

GreenBlue Urbans Hydroplanter system has been proposed around the building to convey water and improve the aesthetics of the site. By locating these systems under windows, it will direct other residents away from the building providing privacy for rooms at this part of the site. Additionally, these systems do not slope down and can be laid level, reducing trip hazards.

Along the same line, permeable block paving has been proposed in the parking areas to define the parking locations, treat the surface water and remove trip hazards or obstacles that might be a risk to the residents.

With limited space available below ground attenuation systems have been used to maximise amenity space on the site. As such the geocellular tank has been placed under the driveway where machinery can easily be brough on to make repairs as needed.

3.5 Standard S5 – Biodiversity

At present the existing site is devoid of any plants with woodlands areas surround the property. Large improvements are being made on this through the introduction of rain gardens and a new landscaping design.

To protect the existing structure and allow for easy maintenance of the rain gardens the GreenBlue Urban Hydroplanter have been used. See Figure 2 below for a typical arrangement similar to the front driveway situation.

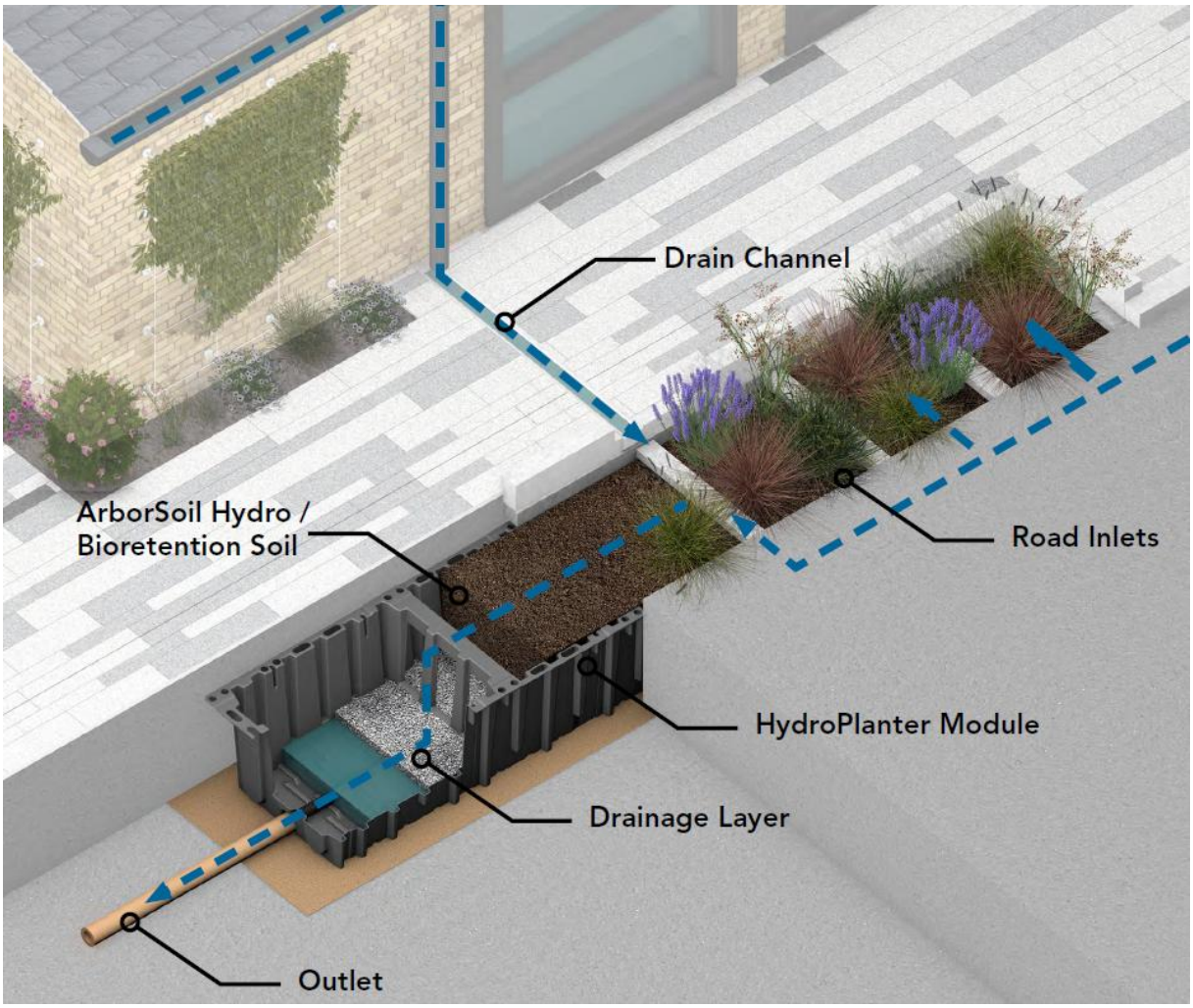


Figure 2: Site GreenBlue Urban Hydroplanter Arrangement

This system will provide pollinating species and a habitat for smaller animals and insects. Given the wider woodland habitat surrounding the site this connection biodiversity should be a welcome addition to the area especially for local birds and insects.

A landscaping scheme by DP Landscaping Architects has been undertaken. Refer to Landscaping plans and planting schedule for more information.

Refer to Appendix E Landscaping scheme by Landscape Architect.

3.6 Standard S6 – Construction, Operations, Maintenance and Structural Integrity

The proposed development will be maintained and manged by the freeholders of the land, who will be responsible for the upkeep and ensuring all drainage systems are functional. To ensure maintenance is kept as simple as possible, shallow systems with regular access have been placed in an area where repair works can be safely undertaken and quickly inspected.

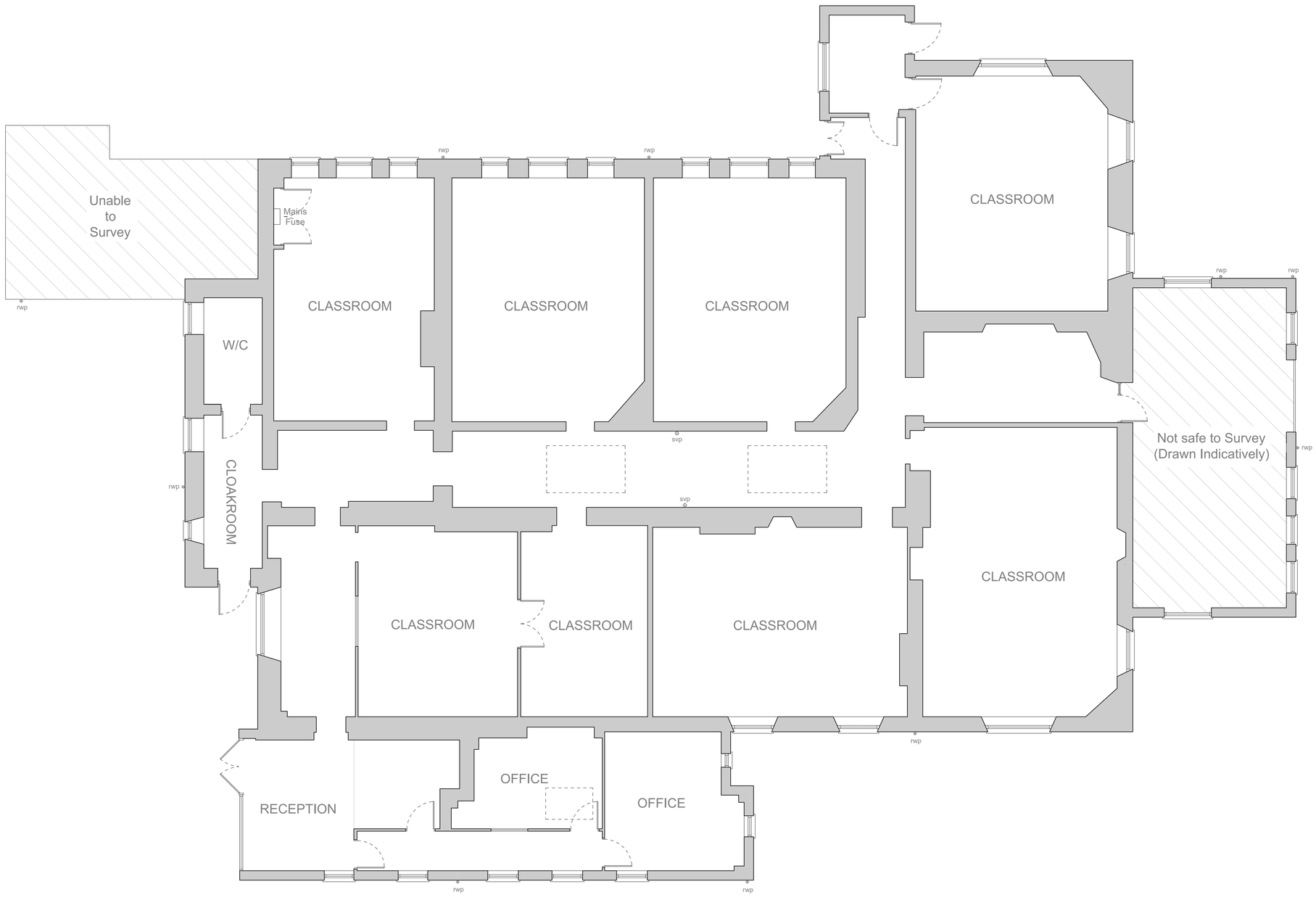
Vehicles and any plant or equipment needed for the works can be easily brought onto the site via the large access gates and stored without hindering access to the site.

Guidance for maintenance of the drainage design will follow the CIRIA 753 Chapter 32 and any other manufactures recommendations.

All SuDS systems will be as per the proposed drainage plans and details, refer to Appendix B.

Further information is provided on the Construction, Operation, Maintenance and Structural Integrity report by Lutra Consultancy: Ref COMSI-26007-01-Gowerton.

APPENDIX A: Existing Site Plan and Proposed Development Plans



GROUND FLOOR

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REVISIONS

RICHARD ANDREWS ARCHITECTS
SUSTAINABLE MODERN CREATIVE

SUITE 2.3, THE ESTATES OFFICE, 25-26
GOLD TOPS, NEWPORT, NP20 4PG

PHONE: 01633 744144
EMAIL: admin@ra-architects.co.uk

Richard Andrews Architects Ltd.
Registered in England & Wales No.8274171.
Registered Office: Companies House, Crown Way, Cardiff, CF14 3UZ.

www.ra-architects.co.uk

Job: Former Gowerton Primary School

Drawing: Existing Plans
School Building

Number: R916–03 A0

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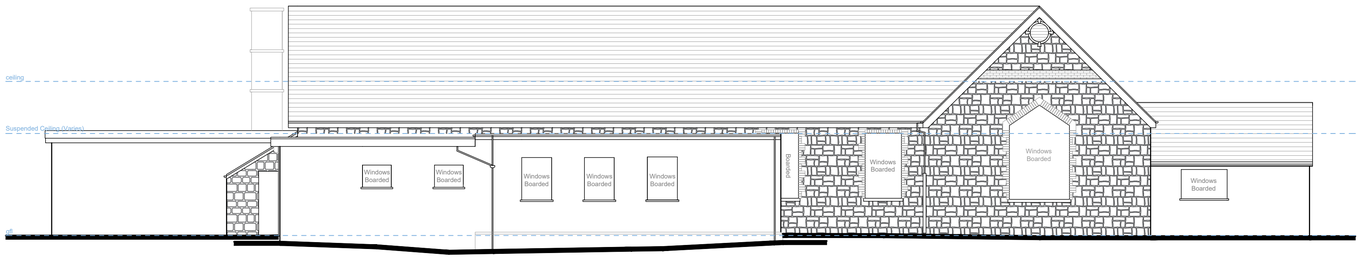

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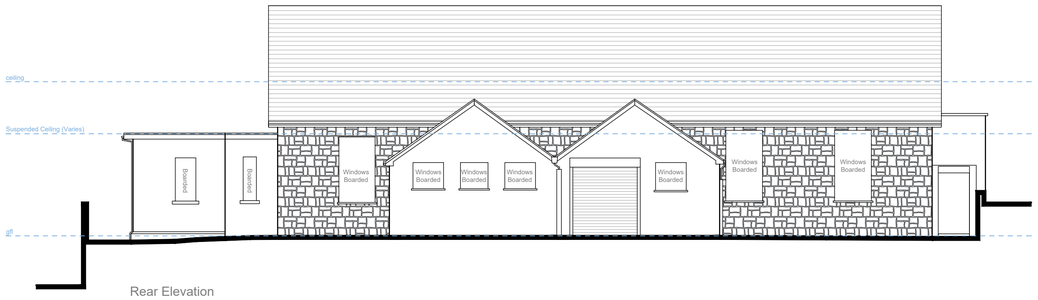

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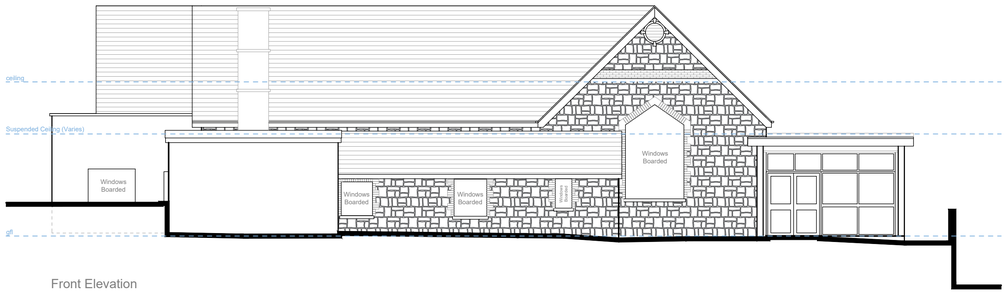

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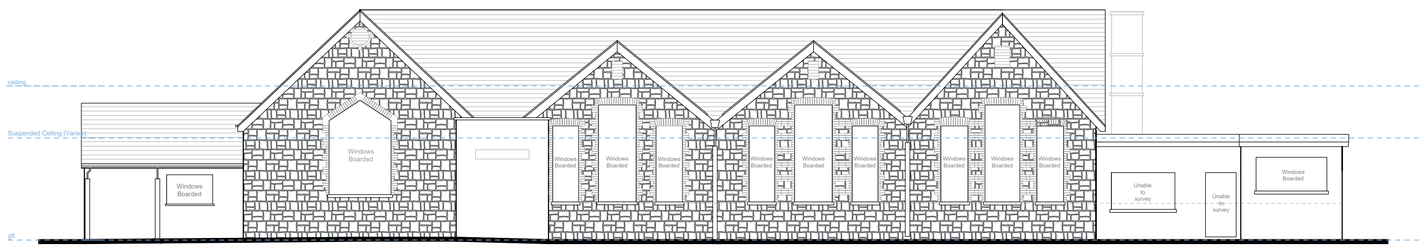

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Side Elevation

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RICHARD ANDREWS ARCHITECTS
SUSTAINABLE MODERN CREATIVE

SUITE 2.3, THE ESTATES OFFICE, 25-26
GOLD TOPS, NEWPORT, NP20 4PG

PHONE: 01633 744144
EMAIL: admin@ra-architects.co.uk

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Drawing Existing Elevations
School Building

Number R916 – 04 A1

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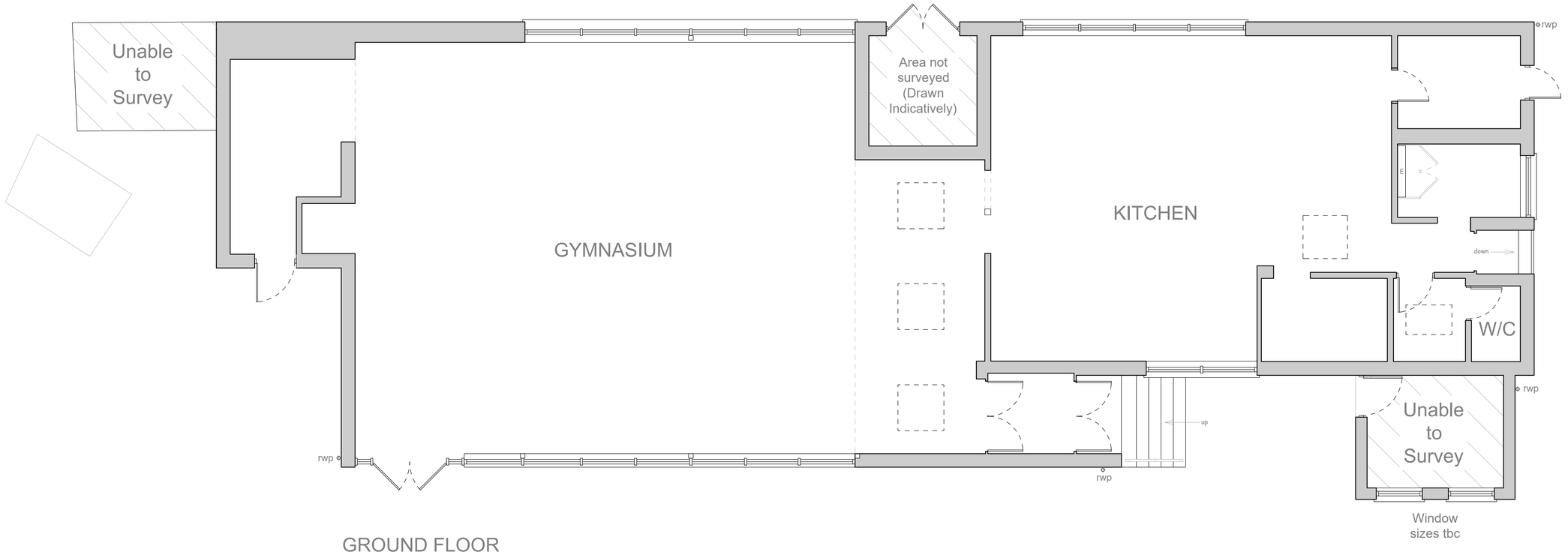

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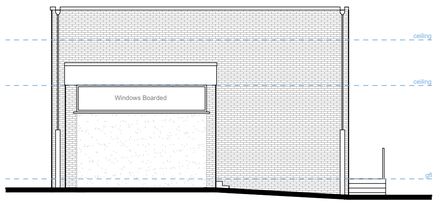

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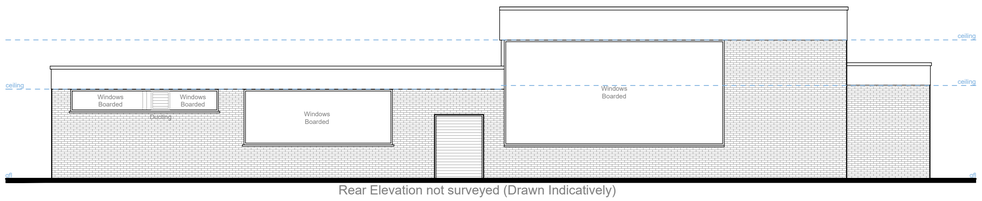

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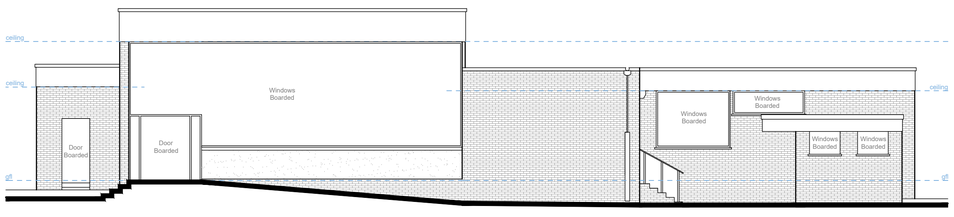

Front Elevation

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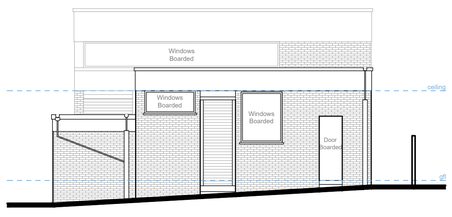

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RICHARD ANDREWS ARCHITECTS
SUSTAINABLE MODERN CREATIVE

SUITE 2.3, THE ESTATES OFFICE, 25-26
GOLD TOPS, NEWPORT, NP20 4PG

PHONE: 01633 744144
EMAIL: admin@ra-architects.co.uk

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Drawing: Existing Plans and Elevations Gymnasium

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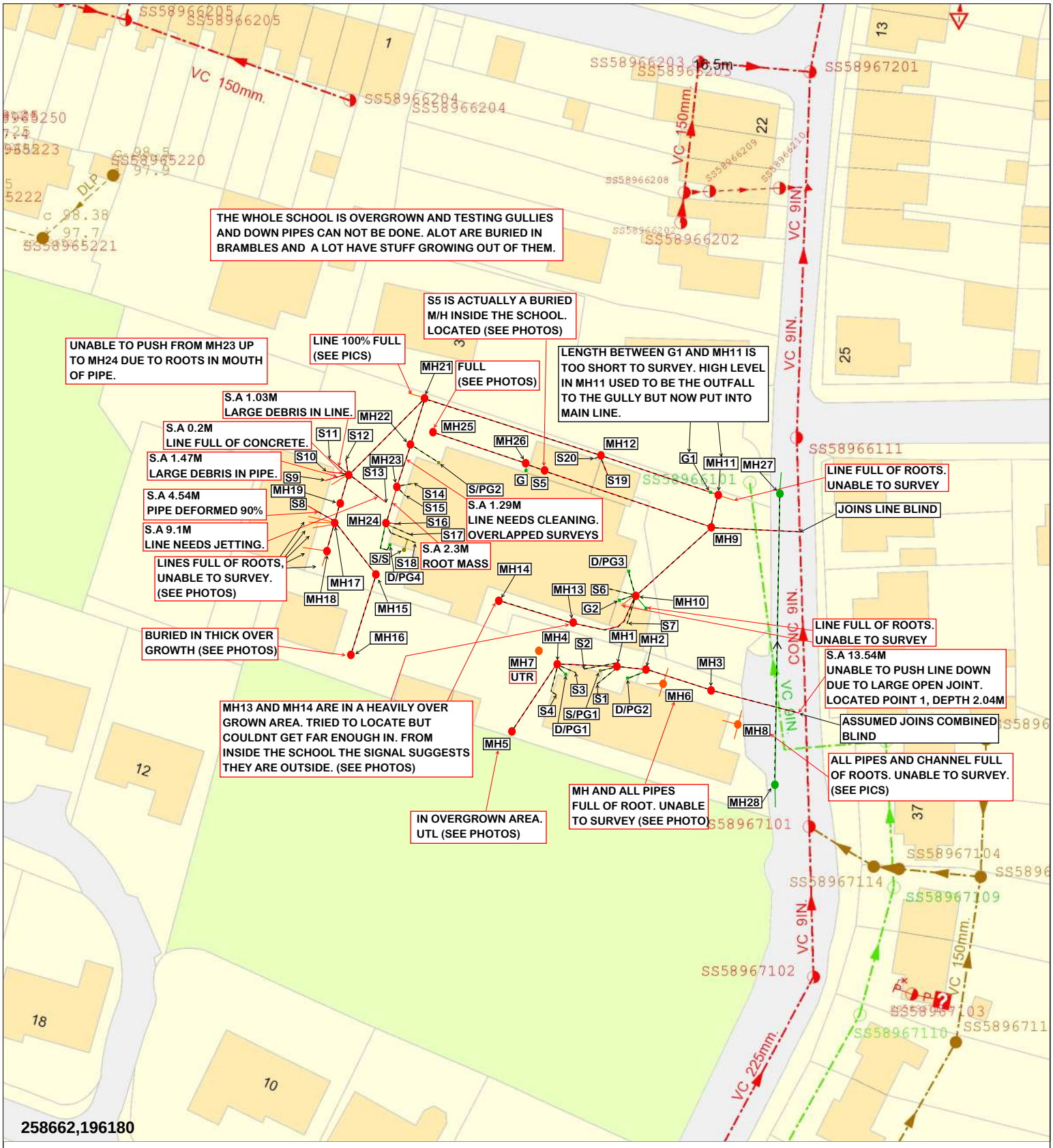


Key:
SA - Survey Abandoned
UTL - Unable to Locate

DRAINTECH
Cleaning • Surveys • Lining • Civils

Job/Plan ref: 20549 - 01 - 001

Scale: 1:750

26/06/2025

EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

Dŵr Cymru Welsh Water

LEGEND

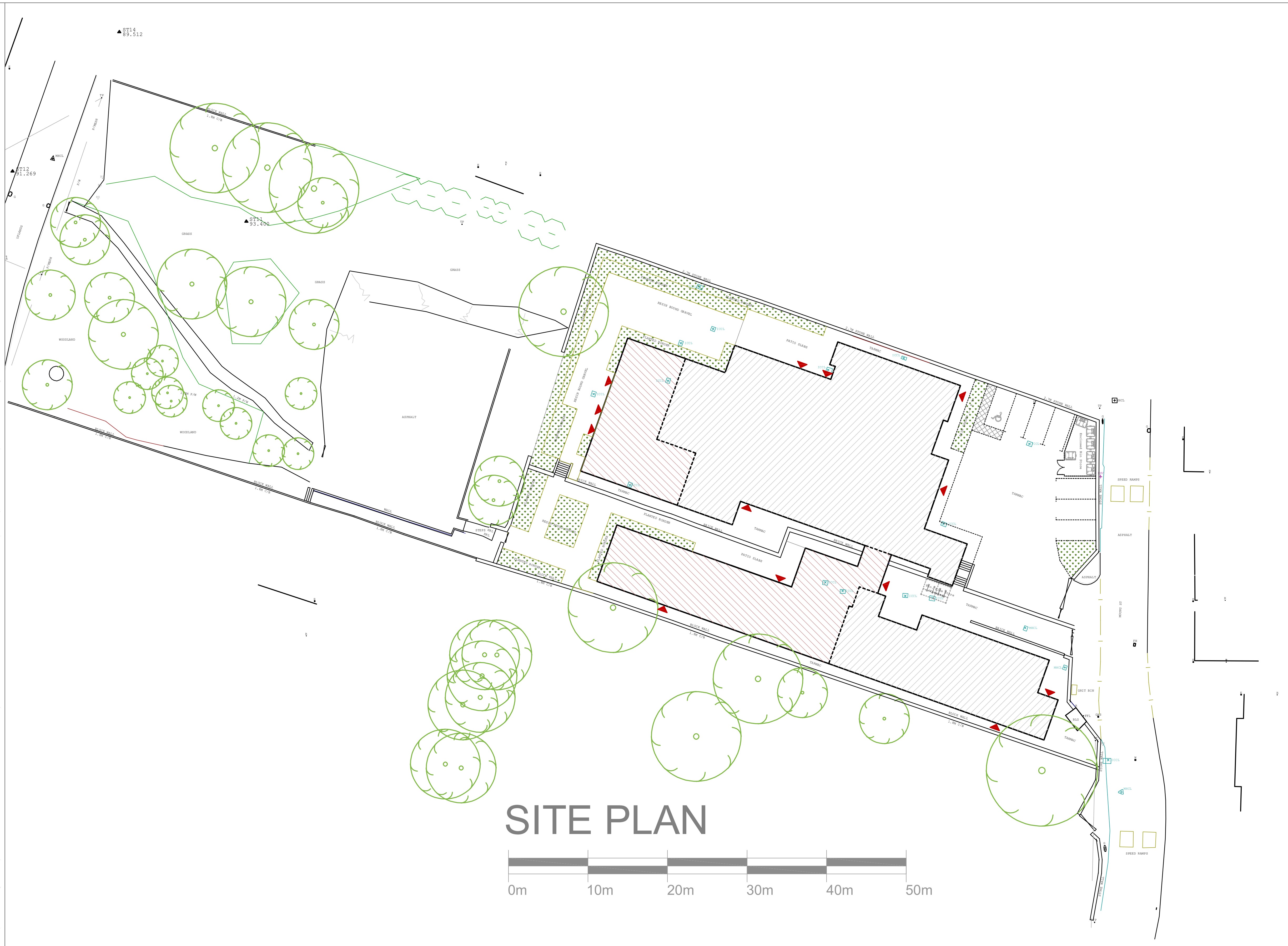
- Sluice Valve
- Air Valve SINGLE
- Tap
- Pressure Reducing Valve
- Meter
- Bulk Meter
- Fire Hydrant
- Cap
- Non Dwr Cymru
- Existing Distribution Main
- Inspection Chamber
- Gravity Sewer
- Rising Main
- Outfall
- Pumping Station
- Lamphole
- Combined Sewer Overflow
- Special Purpose Chamber
- Treatment Works
- Private Sewer Transfer
- Lateral Drain

NB: Sewer symbol colour indicates the sewer type.
RED - Combined
GREEN - Surface Water
BROWN - Foul

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

Dwr Cymru Cyfyngedig ('the Company') gives this infirmation as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is supplied hereby by the company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 based particular, but without prejudice to be generality of that foregoing, it should be noted that the records that are available to the company may not disclose the existence of a drain sewer or disposal main laid before 1 September 1989, or if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of thisinformation is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the company's right to be compensated for any damageto its apparatus.

30/01/2026 14:05:46 L:\RA Architects\RAA Projects\R916 Former Gowerton Primary School, Mount Street, Gowerton\CAD\R916 – Proposed v4b.dwg – A3



Number **R916–17 A3**

NOTES:
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NOTES:
DRAWINGS HAVE BEEN PRODUCED FOR PLANNING AND BUILDING REGULATIONS PURPOSES ONLY. THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015 (CDM) IS THE RESPONSIBILITY OF THE CLIENT/ CONTRACTOR UNLESS OTHERWISE AGREED IN WRITING.

A	Amended Parking and added Bike / Bin Store	08/01/26

REVISIONS

RICHARD ANDREWS ARCHITECTS
SUSTAINABLE MODERN CREATIVE

SUITE 2.3, THE ESTATES OFFICE, 25-26 GOLD TOPS, NEWPORT, NP20 4PG

PHONE: 01633 744144
EMAIL: admin@ra-architects.co.uk

Richard Andrews Architects Ltd.
Registered in England & Wales No.8274171.
Registered Office: Companies House, Crown Way, Cardiff, CF14 3UZ

www.ra-architects.co.uk

Job FORMER GOWERTON PRIMARY SCHOOL

Drawing PROPOSED SITE PLAN

Number **R916-17 A3**

Scale	Date	Drawn	Checked
1:500	08/25	LS	

Drawing No R916–10C A1

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NOTES:
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REVISIONS

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SUITE 2.3, THE ESTATES OFFICE, 25-26
GOLD TOPS, NEWPORT, NP20 4PG

PHONE: 01633 744144
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Richard Andrews Architects Ltd.
Registered in England & Wales No.6274171.
Registered Office: Companies House, Crown Way, Cardiff, CF14 3UZ

www.ra-architects.co.uk

Job: Former Gowerton Primary School

Drawing: PROPOSED SKETCH GENERAL ARRANGEMENT LAYOUT

Number: R916–10C A1

Scale	Date	Drawn	Checked
1:100	05/25	LS	

APPENDIX B: Proposed Drainage Plans & Details

Note
All existing drainage shown is taken from 'Draintech' CCTV survey dated 26/06/2025

Legend
- Existing Foul / Combined Drainage (as undertaken by 'Draintech'
- Existing DCWW Surface Water Sewer
- Existing DCWW Foul / Combined Water Sewer

Existing DCWW 225 dia. concrete foul / combined sewer

Existing DCWW 225 dia. VC surface water sewer

0 10m 20m

Scale 1:200 @ A2

Quorum CONSULTING ENGINEERS
Office 45, Sony UK Technology Centre, Pencoed Technology Park, Pencoed, CF35 5HZ
Tel: 01446 774493
Email: info@qapm.com

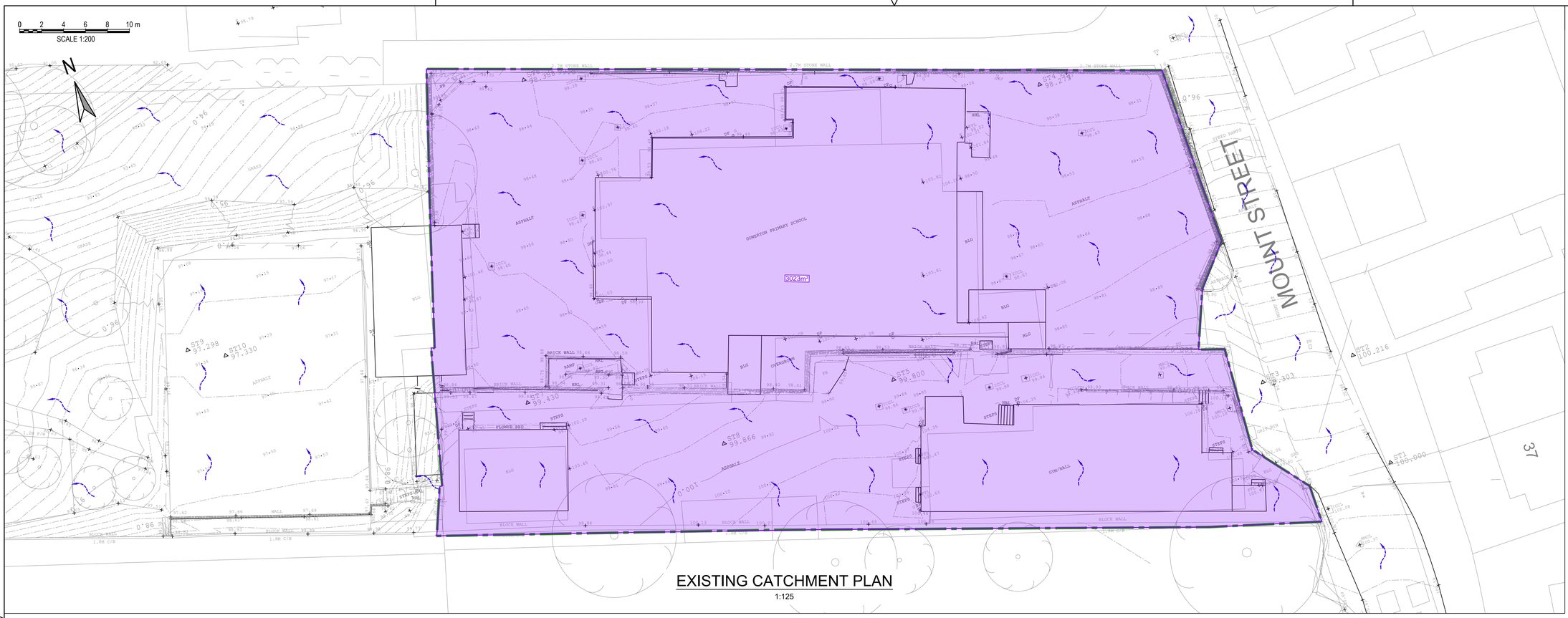
General Notes
Do not scale from this drawing. Dimensions must be checked on site. All works to comply with current Building Regulations.
All site works must be to the current drawing revision. Drawing is copyright of Quorum Project Management Ltd.
All levels to be verified by contractor on site. Any concerns by the contractor to be raised with the engineer prior to any installation/fabrication works.
The drawing information must be read in conjunction with all relevant scheme drawings, specification and/or schedules referred to or not.
The contractor is responsible to insure that all work is in compliance with current Building Regulations and or other relevant legislation
Dimensions on this drawing are not to be used for construction purposes.

Rev.	Date	Description
-	--.--.--	-

Drawing: EXISTING DRAINAGE LAYOUT
Project: FORMER GOWERTON PRIMARY SCHOOL

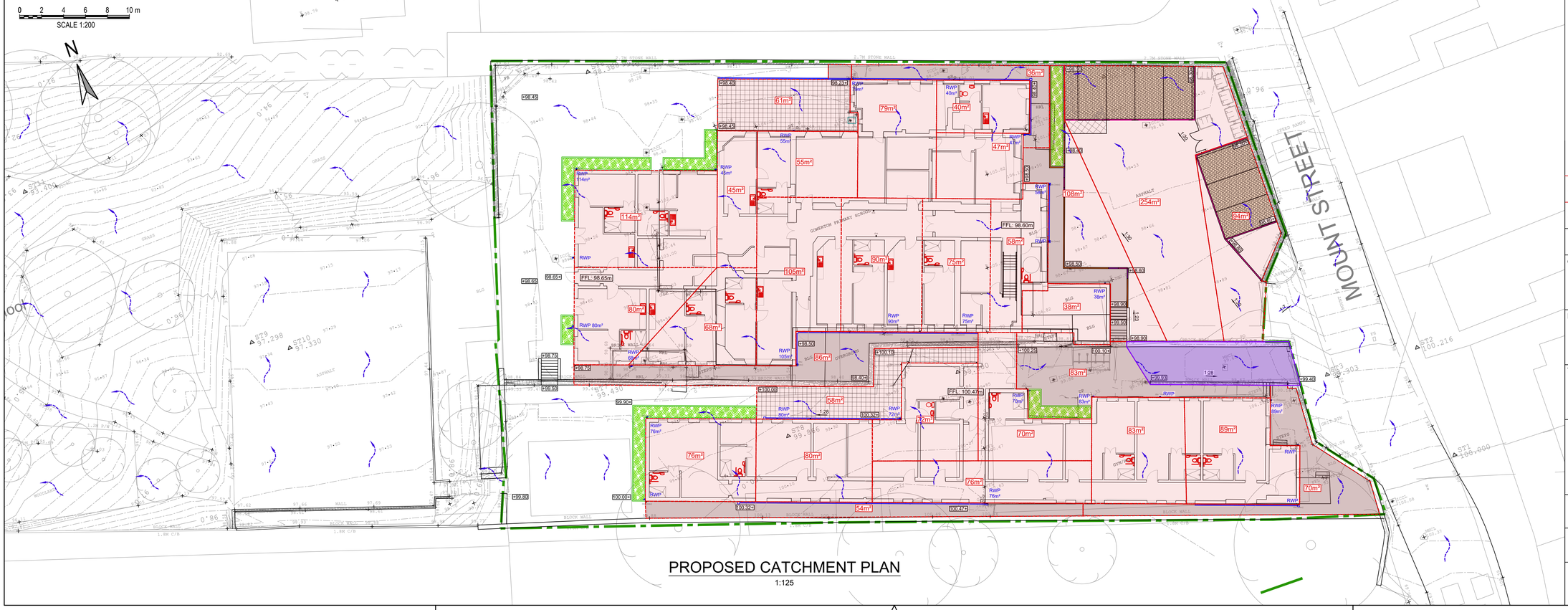
Project No.	PM2521-25	Drawing No.	QPM-DR-C-950
Rev.	-		
Scale	1:200 @ A2	Drawn by	LE
Date	JAN 2026	Chkd by	PCH
Status	PRELIMINARY		

Sheet ACAD - A1 rev. C



EXISTING CATCHMENT PLAN

1:125



PROPOSED CATCHMENT PLAN

1:125

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THE DRAWING. USE FIGURED DIMENSIONS ONLY.
4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.

CATCHMENT KEY

- SITE BOUNDARY
- EXISTING IMPERMEABLE AREAS
- PROPOSED IMPERMEABLE AREAS
- EXCEEDANCE FLOWS

SITE ASSESSMENT	
SITE AREA =	**3023m²**
EXISTING CATCHMENT =	**3023m²**
PROPOSED CATCHMENT AREA =	**2395m²**
PROPOSED SOFTLANDSCAPE AREA =	**628m²**

rev.	drawn	chkd	apprvd	date	description
01	JW			02/02/26	UPDATED TO SUIT LANDSCAPE AND ARCHITECT'S PLANS
01	JW			26/01/26	ISSUED FOR DISCUSSION

Client

SQUIRREL WOOD PROPERTIES

Project

TRE-GWYR JUNIOR SCHOOL
MOUNT STREET, GOWERTON
SA4 3DR

Title

CATCHMENT PLAN

LUTRA CONSULTANCY
Email: joel@lutraconsultancy.co.uk

date	drawn
JANUARY 2026	JW
scale @ A1	project No.
1:200	26009

status	drg. no.	rev.
P	501	02

ORIGINAL DRAWING SIZE 841 x 594

10 0 10 20 50 100mm NATURAL SCALE

A1

Sheet ACAD - A1 rev. C

0 1.25 2.5 3.75 5.0 6.25 m
SCALE 1:125

N

DRAINAGE OVER 1m BELOW GROUND TO BE LAID LESS THAN 1m FROM EXISTING BUILDING IN ACCORDANCE WITH SE RECOMMENDATION TO PREVENT UNDERMINING OF EXISTING FOUNDATION

HIT AND MISS KERBING TO ALLOW FOR RUN OFF FROM DRIVEWAY INTO RAIN GARDENS

NEW CONNECTION ON LINE OF EXISTING DCWW SUBJECT TO S106 AGREEMENT. SEWER LINE TO BE ACCURATELY LOCATED AND DEPTH CONFIRMED

HYDROBRAKE VORTEX FLOW CONTROL CHAMBER SET TO 15 l/s WITH 1.8m DESIGN HEAD WITH BYPASS LEVER AND SUMP.

PERMEABLE PAVING TO DRAIN PARKING AREA AND PROVIDE WATER TREATMENT

FOUL DRAINAGE TO JOIN EXISTING COMBINED SYSTEM

SEPARATION IN RAINGARDEN TO ALLOW FOR FOUL DRAINAGE TO PASS THROUGH

INTERNAL FOUL SVP LOCATION TO BE CONFIRMED

NUTRIENT/NITRATE TREATMENT TANK

NEW DRAINAGE TO PASS UNDER NEW STAIRS SUBJECT TO SE COMMENTS

SEWER TO RUN UNDER RAINING WALL FOUNDATIONS SUBJECT TO SE COMMENTS

TURTLE ORIFICE PLATE CHAMBER SET TO 10l/s WITH 0.8m DESIGN HEAD

WAVIN AQUACELL ECO ATTENATION TANK TO CONTROL RUN OFF PREVENTING FLOODING TO DOWNSTREAM RAIN GARDENS

INTERNAL FOUL SVP LOCATION TO BE CONFIRMED

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THE DRAWING. USE FIGURED DIMENSIONS ONLY.
4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
6. EXISTING DRAINAGE TAKEN FROM DCWW LOCAL RECORDS PROVIDED. THESE HAVE BEEN OVERLAID INDICATIVELY. THE SITE CONTRACTOR IS TO CONFIRM THE EXACT LOCATION OF DRAINAGE ONSITE.

PROPOSED DRAINAGE KEY

- FOUL DRAINAGE
- SURFACE WATER DRAINAGE
- SURFACE WATER MANHOLE
- SURFACE WATER ORIFICE PLATE CHAMBER TURTLE ENVIRO
- SURFACE WATER VORTEX FLOW CONTROL HYDROBRAKE
- PERFORATE PIPE
- FILTER DRAIN
- ATTENUATION TANK
- RWP — RAIN WATER PIPE
- YARD GULLY
- ACO CHANNEL HEXDRAIN

EXTERNAL WORKS KEY

- BITUMINOUS DRIVEWAY
- BITUMINOUS FOOTPATH
- PAVED PATIO
- PERMEABLE BLOCK PAVING TOBERMORE HYDROPAVE
- GREENBLUE URBAN HRYDOPLANTER
- BULL NOSED (BN) 125mm
- DROPPER KERB (DP)
- BULL NOSED (BN2) 6mm
- +17.58 PROPOSED LEVEL

rev.	drawn	chkd.	apprvd	date	description
01	JW			26/01/26	ISSUED FOR DISCUSSION
01	JW			02/02/26	UPDATED TO SUIT LANDSCAPE AND ARCHITECTS LAYOUTS

Client
SQUIRREL WOOD PROPERTIES

Project
TRE-GWYR JUNIOR SCHOOL
MOUNT STREET, GOWERTON
SA4 3DR

Title
PROPOSED DRAINAGE PLAN

LUTRA CONSULTANCY
Email: joel@lutraconsultancy.co.uk

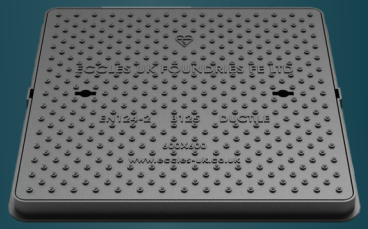
date	drawn
JANUARY 2026	JW
scale @ A1	project No.
1:125	26007
status	drg. no.	rev.
P	502	02

ORIGINAL DRAWING SIZE 841 x 594

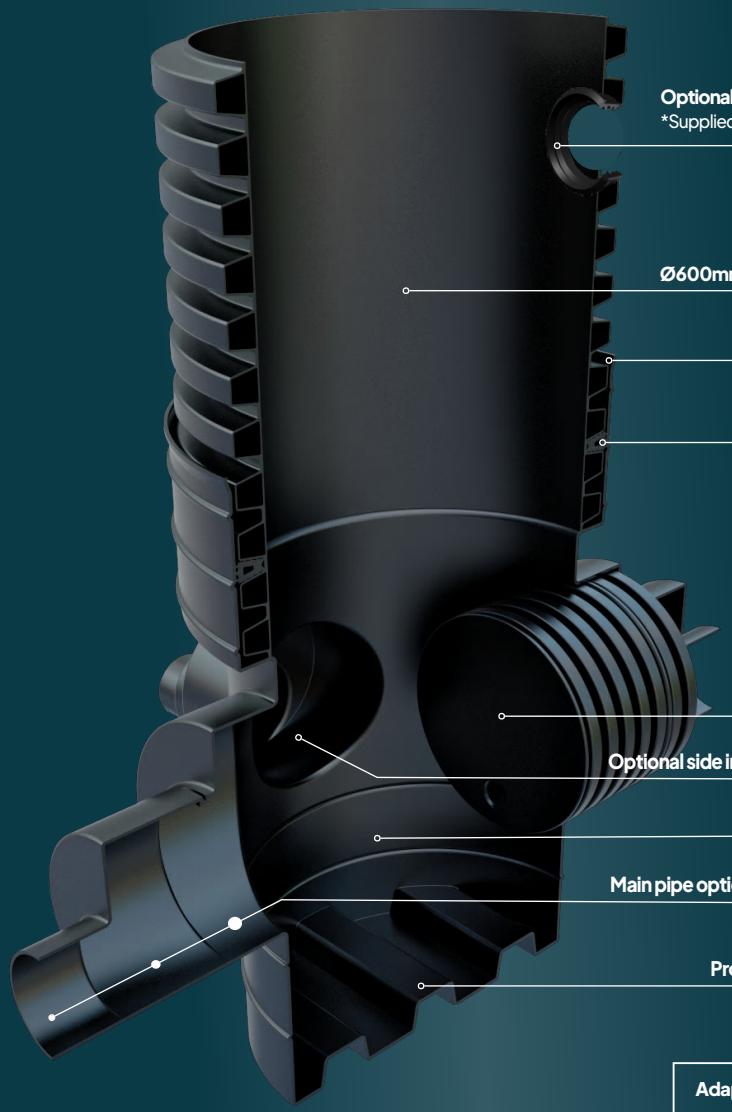
10 0 10 20 50 100mm NATURAL SCALE

A1

P series
unprotected plate



Access Covers
We offer a range of covers for up to B125 loading.
However chambers can accommodate covers up to D400 loading , if required.



Adaptors
Adaptors are available to fit other pipe systems.

improved design | 60yr+ design life | delivered fully assembled | made in the UK

MODEL: **OFCP600B**

oriflo®
orifice flow control chambers

Introduction
The ORIFLO OFCP600B is an unprotected orifice plate flow control chamber designed to regulate surface water discharge within Sustainable Drainage Systems (SuDS). The unit discharges a controlled flow rate to the downstream drainage infrastructure using a fixed orifice plate to provide consistent hydraulic performance.

Engineered for integration into well-managed drainage networks, this chamber plays a key role in balancing flow control efficiency with practical installation and asset longevity.

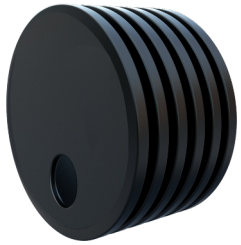
Application
The OFCP600B is installed downstream of attenuation and other storage systems where upstream treatment has already been provided. Typical applications include modular tank systems, oversized pipe storage, geocellular attenuation and permeable paving schemes.

The chamber is suitable for sites requiring controlled discharge without additional silt management at the flow control location.

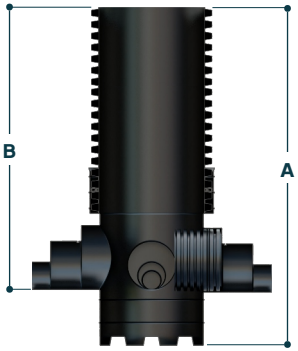
Built to the following standards
- Design & Construction Guidance (DCG) - Section C7.12
- CIRIA 75310.2 - 20.5 Compliant
- BS 8582 - 9.6

Technical Data
- Recommended minimum orifice Ø (Adoptable): **50mm**
- Recommended minimum orifice Ø (Non Adoptable): **20mm**

***Anything below 20mm should have a Protected Orifice.**



Orifice plate assembly



Product code	Main Pipework Options Ø	Side Inlet Options Ø	Depth A	Inlet Invert B	Approx. Weight
	mm	mm	mm	mm	(kg)
OFCP600B/1	160 - 225	110 - 225	1010	690	26
OFCP600B/1.5	160 - 225	110 - 225	1530	1210	35.5
OFCP600B/2	160 - 225	110 - 225	1985	1665	44
OFCP600B/2.4	160 - 225	110 - 225	2375	2055	51.5
OFCP600B/3	160 - 225	110 - 225	2960	2640	62.5

turtle
email: sales@turtleenviro.co.uk | sales & technical support: tel. 01913036315 | **www.turtleenviro.co.uk**

PDS/OFCP600B/12/25/V1

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.800	15.000
Flush-Flo™	0.523	15.000
Kick-Flo®	1.111	11.940
Mean Flow		13.078

This Hydro-Brake® Optimum includes:

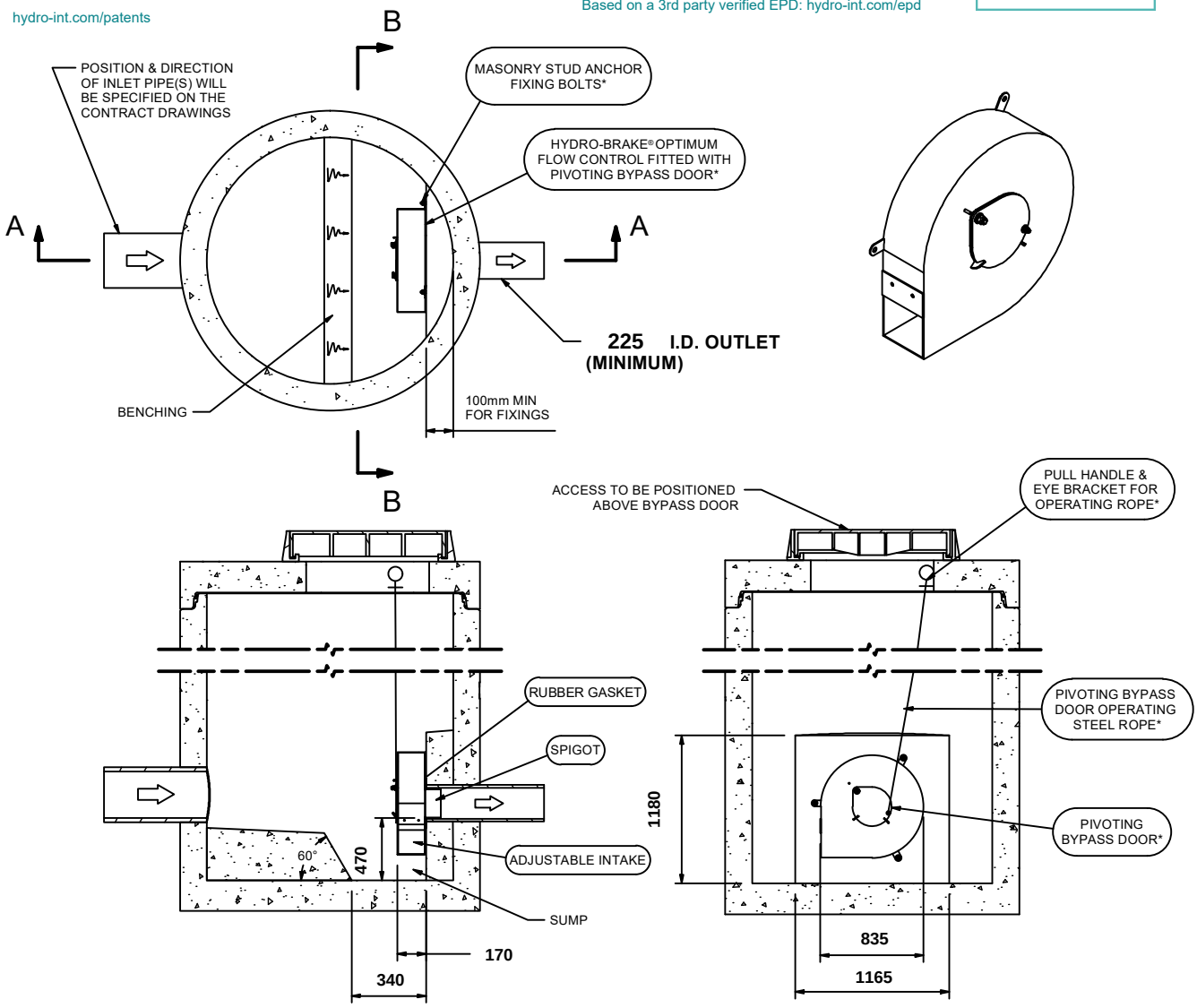
- •All in 5 mm Grade 304L stainless steel
- • Integral pivoting by-pass door allowing clear line of sight through to outlet, c/w operating rope
- • Media blasted for corrosion resistance
- • Variable flow rate post installation via adjustable inlet (if necessary)
- • Indicative Weight: 65 kg
- • Product Carbon Footprint: 279.38 kgCO2e

Based on a 3rd party verified EPD: hydro-int.com/epd

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 08/4596

wrc approved PT/503/0422 Valid: 01/04/2022 - 31/03/2027

hydro-int.com/patents



SECTION A-A

SECTION B-B

IMPORTANT: ⬭ LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® IS A REGISTERED TRADEMARK FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE

The head/flow characteristics of this SHE-0163-1500-1800-1500 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International A CRH COMPANY

DATE	26/01/2026 13:58
SITE	Gowerton
DESIGNER	Joel Wall
REF	26007

SHE-0163-1500-1800-1500
Hydro-Brake® Optimum

joel@lutraconsultancy.co.uk

APPENDIX C: Drainage Calculations

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

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

Project details

Date	25/01/2026
Calculated by	Joel Wall
Reference	26007
Model version	2.2.2

Location

Site name	Tre-Gwyr School
Site location	Gowerton

Site easting (British National Grid)	258667
Site northing (British National Grid)	196152

Site details

Total site area (ha)	0.3065 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	1364 mm		
BFIHOST19scaled	0.434		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	3.4 l/s		
QBar (FEH statistical 2025) (l/s)	3.7 l/s		

Growth curve factors

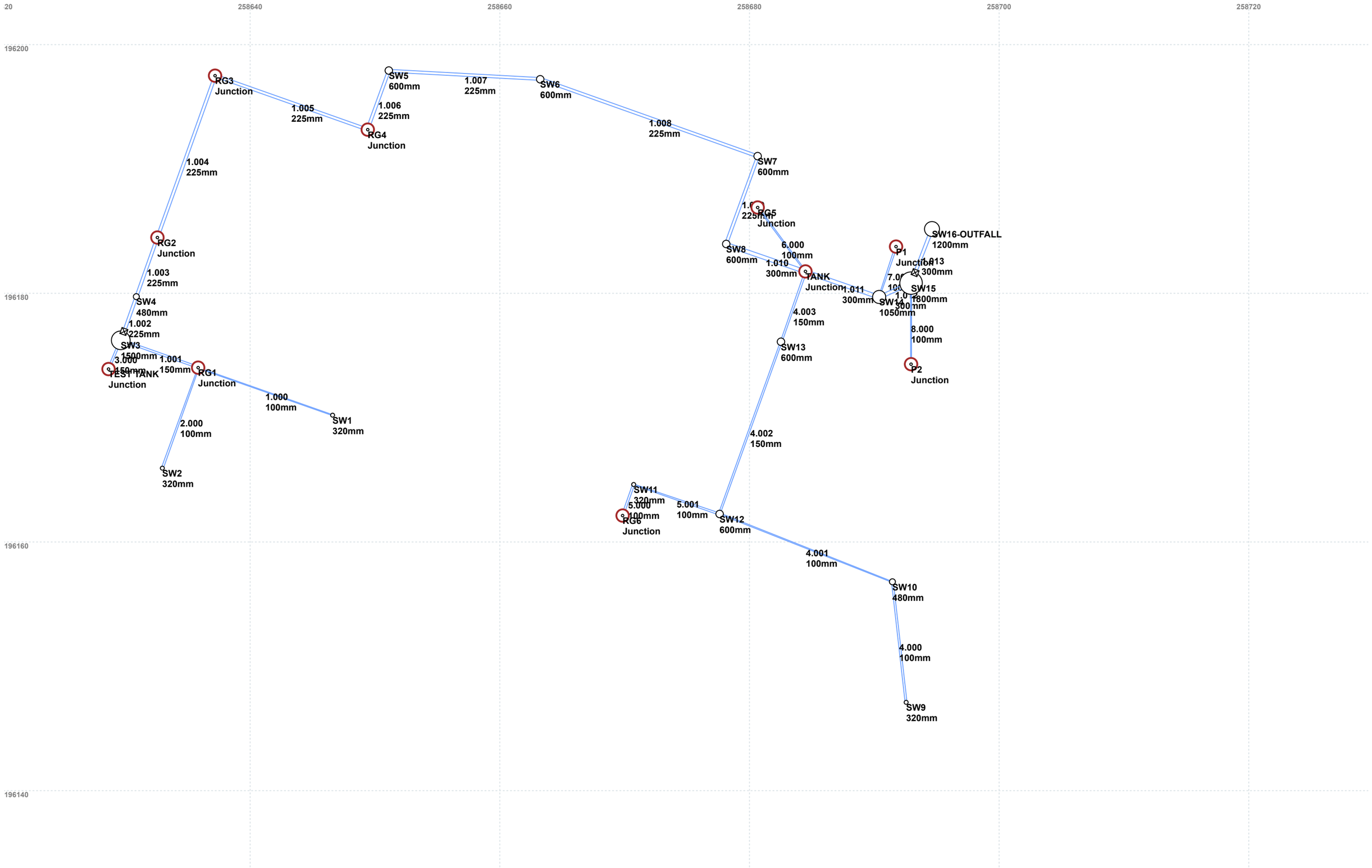
	My value		Map value
Hydrological region	9		9
1 year growth factor	0.88		
2 year growth factor	0.93		
10 year growth factor	1.42		
30 year growth factor	1.78		
100 year growth factor	2.18		
200 year growth factor	2.46		

Results

Method	FEH statistical (2025)	
Flow rate 1 year (l/s)	3.2	l/s
Flow rate 2 year (l/s)	3.4	l/s
Flow rate 10 years (l/s)	5.2	l/s
Flow rate 30 years (l/s)	6.6	l/s
Flow rate 100 years (l/s)	8.0	l/s
Flow rate 200 years (l/s)	9.1	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer



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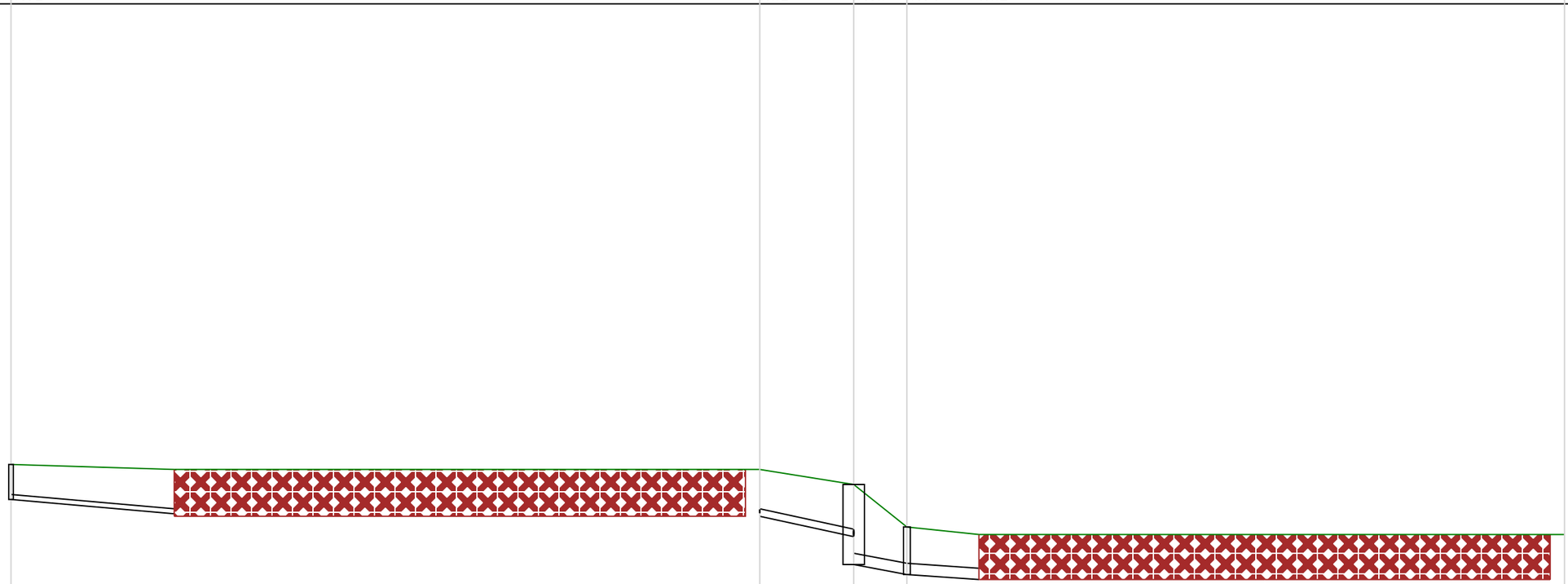
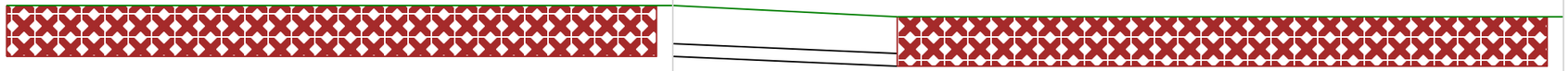
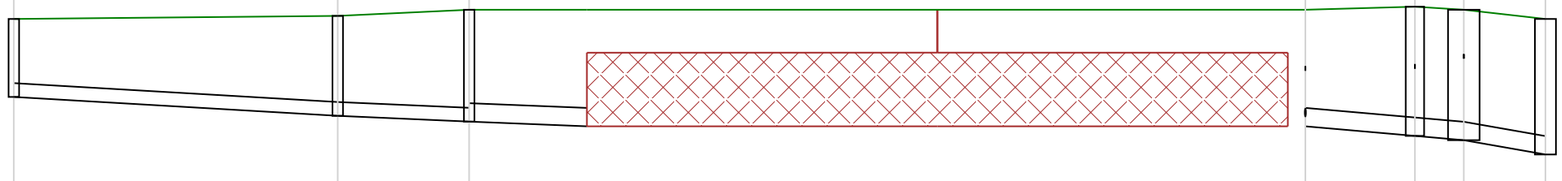
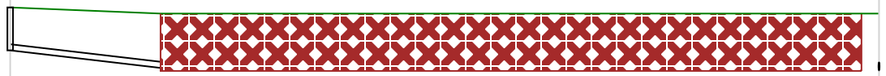
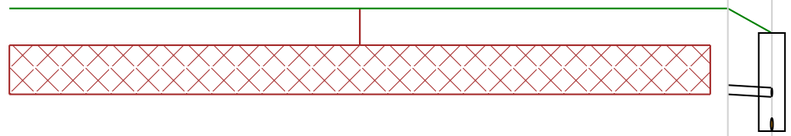
						
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 89.000						
Link Name	1.000		1.001	1.002	1.003	
Section Type	100mm		150mm	225mm	225mm	
Slope (1:X)	40.0		16.2	18.6	50.5	
Cover Level (m)	100.000		99.900	99.600	98.750	98.600
Invert Level (m)	99.300	99.014	98.964	98.557	98.000 97.800	97.800 97.700
Length (m)	11.428		6.577	3.726	5.046	

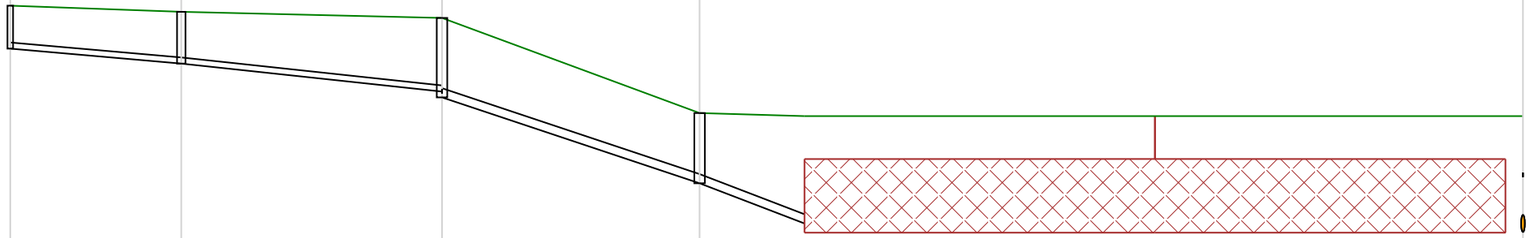
Node Name		RG2	RG3	
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 88.000				
Link Name		1.004		
Section Type		225mm		
Slope (1:X)		80.0		
Cover Level (m)		98.600	98.400	
Invert Level (m)		97.700	97.527	
Length (m)		13.812		

Node Name		RG3		RG4	SW5	SW6
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 88.000						
Link Name		1.005		1.006	1.007	
Section Type		225mm		225mm	225mm	
Slope (1:X)		80.0		60.0	60.0	
Cover Level (m)		98.400		98.400	98.400	98.350
Invert Level (m)		97.527	97.365	97.365	97.281 / 97.281	97.079
Length (m)		12.979		5.044	12.148	

Node Name		SW6	SW7	SW8	TANK	SW14	SW15	SW16-OUTFALL
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 87.000								
Link Name		1.008	1.009	1.010	1.011	1.012	1.013	
Section Type		225mm	225mm	300mm	300mm	300m	300mm	
Slope (1:X)		60.0	80.0	87.3	40.0	40.0	20.0	
Cover Level (m)		98.350	98.400	98.500	98.500	98.550	98.500	98.350
Invert Level (m)		97.079	96.771 / 96.771	96.677 / 96.677	96.600 / 96.600	96.444 / 96.444	96.374 / 96.374	96.141
Length (m)		18.483	7.501	6.719	6.252	2.789	4.658	

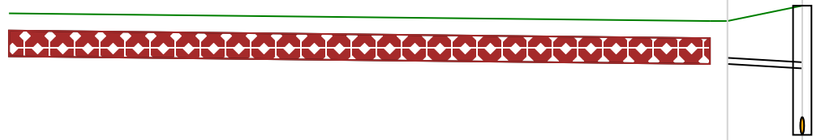
Node Name		SW2	RG1	
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 89.000				
Link Name		2.000		
Section Type		100mm		
Slope (1:X)		30.0		
Cover Level (m)		100.000	99.900	
Invert Level (m)		99.300	99.014	
Length (m)		8.579		

Node Name	TEST STAN	1A3
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 89.000		
Link Name	3.000	
Section Type	150m	
Slope (1:X)	58.4	
Cover Level (m)	100.000	99.600
Invert Level (m)	98.600	98.557
Length (m)	2.512	

Node Name		SW9	SW10	SW12	SW13	TANK
						
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 88.000						
Link Name		4.000	4.001	4.002	4.003	
Section Type		100mm	100mm	150mm	150mm	
Slope (1:X)		40.0	32.6	10.5	9.1	
Cover Level (m)		100.300	100.200	100.100	98.550	98.500
Invert Level (m)		99.600 / 99.356	99.356 / 98.900	98.805 / 97.405	97.405	96.750
Length (m)		9.758	14.879	14.698	5.987	

Node Name		RG6	SW11	SW12
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 89.000				
Link Name		5.000	5.001	
Section Type		100m	100mm	
Slope (1:X)		58.9	12.1	
Cover Level (m)		100.200	100.200	100.100
Invert Level (m)		99.500 99.455	99.455	98.855
Length (m)		2.650	7.281	

Node Name		RG5 TANK	
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 87.000			
Link Name		6.000	
Section Type		100mm	
Slope (1:X)		59.3	
Cover Level (m)		98.300	98.500
Invert Level (m)		97.600	97.492
Length (m)		6.410	

Node Name		P1	SW14
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 87.000			
Link Name		7.000	
Section Type		100mm	
Slope (1:X)		59.3	
Cover Level (m)		98.300	98.550
Invert Level (m)		97.600	97.528
Length (m)		4.269	

Node Name		P2	SW15
A3 drawing Hor Scale 350 Ver Scale 100 Datum (m) 87.000			
Link Name		8.000	
Section Type		100mm	
Slope (1:X)		59.3	
Cover Level (m)		98.500	98.500
Invert Level (m)		97.800	97.690
Length (m)		6.522	

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
SW1	0.021	5.00	100.000	320	258646.603	196170.198	0.700
SW2	0.013	5.00	100.000	320	258632.964	196165.935	0.700
RG1	0.008	5.00	99.900		258635.833	196174.020	0.936
SW3			99.600	1500	258629.634	196176.219	1.600
SW4	0.033	5.00	98.750	480	258630.881	196179.730	0.950
RG2	0.008	5.00	98.600		258632.569	196184.485	0.900
RG3	0.011	5.00	98.400		258637.188	196197.502	0.873
RG4	0.005	5.00	98.400		258649.420	196193.162	1.035
SW5			98.400	600	258651.107	196197.916	1.119
SW6	0.020	5.00	98.350	600	258663.235	196197.214	1.271
SW7	0.012	5.00	98.400	600	258680.654	196191.032	1.629
SW8	0.006	5.00	98.500	600	258678.138	196183.966	1.823
RG5	0.011	5.00	98.300		258680.656	196186.900	0.700
SW9	0.007	5.00	100.300	320	258692.551	196147.102	0.700
SW10	0.009	5.00	100.200	480	258691.451	196156.798	0.844
RG6	0.015	5.00	100.200		258669.836	196162.123	0.700
SW11			100.200	320	258670.722	196164.621	0.745
SW12	0.008	5.00	100.100	600	258677.607	196162.251	1.295
SW13	0.004	5.00	98.550	600	258682.522	196176.103	1.145
TANK			98.500		258684.484	196181.759	1.900
P1	0.025	5.00	98.300		258691.742	196183.755	0.700
SW14			98.550	1050	258690.389	196179.706	2.106
P2	0.009	5.00	98.500		258692.944	196174.299	0.700
SW15			98.500	1800	258692.945	196180.821	2.126
SW16-OUTFALL			98.350	1200	258694.621	196185.167	2.209
TEST TANK		5.00	100.000		258628.654	196173.906	1.400

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	SW1	RG1	11.428	0.600	99.300	99.014	0.286	40.0	100	5.16	48.9
2.000	SW2	RG1	8.579	0.600	99.300	99.014	0.286	30.0	100	5.10	49.1
1.001	RG1	SW3	6.577	0.600	98.964	98.557	0.407	16.2	150	5.20	48.7
1.002	SW3	SW4	3.726	0.600	98.000	97.800	0.200	18.6	225	5.22	48.7
1.003	SW4	RG2	5.046	0.600	97.800	97.700	0.100	50.5	225	5.27	48.5
1.004	RG2	RG3	13.812	0.600	97.700	97.527	0.173	80.0	225	5.42	47.9
1.005	RG3	RG4	12.979	0.600	97.527	97.365	0.162	80.0	225	5.57	47.4
1.006	RG4	SW5	5.044	0.600	97.365	97.281	0.084	60.0	225	5.62	47.2
1.007	SW5	SW6	12.148	0.600	97.281	97.079	0.202	60.0	225	5.74	46.7
1.008	SW6	SW7	18.483	0.600	97.079	96.771	0.308	60.0	225	5.92	46.1
1.009	SW7	SW8	7.501	0.600	96.771	96.677	0.094	80.0	225	6.01	45.8
1.010	SW8	TANK	6.719	0.600	96.677	96.600	0.077	87.3	300	6.07	45.6
6.000	RG5	TANK	6.410	0.600	97.600	97.492	0.108	59.3	100	5.11	49.1
4.000	SW9	SW10	9.758	0.600	99.600	99.356	0.244	40.0	100	5.13	49.0
4.001	SW10	SW12	14.879	0.600	99.356	98.900	0.456	32.6	100	5.32	48.3
5.001	SW11	SW12	7.281	0.600	99.455	98.855	0.600	12.1	100	5.10	49.1
4.002	SW12	SW13	14.698	0.600	98.805	97.405	1.400	10.5	150	5.39	48.0
4.003	SW13	TANK	5.987	0.600	97.405	96.750	0.655	9.1	150	5.42	47.9
1.011	TANK	SW14	6.252	0.600	96.600	96.444	0.156	40.0	300	6.12	45.4
7.000	P1	SW14	4.269	0.600	97.600	97.528	0.072	59.3	100	5.07	49.2
1.012	SW14	SW15	2.789	0.600	96.444	96.374	0.070	40.0	300	6.13	45.4
8.000	P2	SW15	6.522	0.600	97.800	97.690	0.110	59.3	100	5.11	49.1
1.013	SW15	SW16-OUTFALL	4.658	0.600	96.374	96.141	0.233	20.0	300	6.16	45.3
5.000	RG6	SW11	2.650	0.600	99.500	99.455	0.045	58.9	100	5.04	49.3

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.223	9.6	3.7	0.600	0.786	0.021	0.0	43	1.147
2.000	1.414	11.1	2.3	0.600	0.786	0.013	0.0	31	1.114
1.001	2.518	44.5	7.3	0.786	0.893	0.042	0.0	41	1.873
1.002	3.045	121.1	7.3	1.375	0.725	0.042	0.0	37	1.698
1.003	1.845	73.4	13.0	0.725	0.675	0.074	0.0	64	1.399
1.004	1.463	58.2	14.3	0.675	0.648	0.082	0.0	76	1.217
1.005	1.463	58.2	16.1	0.648	0.810	0.094	0.0	80	1.253
1.006	1.691	67.2	16.8	0.810	0.894	0.098	0.0	76	1.408
1.007	1.691	67.2	16.6	0.894	1.046	0.098	0.0	76	1.408
1.008	1.691	67.2	19.7	1.046	1.404	0.118	0.0	83	1.472
1.009	1.463	58.2	21.5	1.404	1.598	0.130	0.0	94	1.355
1.010	1.684	119.0	22.4	1.523	1.600	0.136	0.0	88	1.300
6.000	1.001	7.9	1.9	0.600	0.908	0.011	0.0	34	0.831
4.000	1.223	9.6	1.2	0.600	0.744	0.007	0.0	25	0.847
4.001	1.355	10.6	2.8	0.744	1.100	0.016	0.0	35	1.139
5.001	2.230	17.5	2.7	0.645	1.145	0.015	0.0	27	1.631
4.002	3.127	55.3	6.9	1.145	0.995	0.040	0.0	35	2.134
4.003	3.352	59.2	7.5	0.995	1.600	0.043	0.0	36	2.310
1.011	2.493	176.2	31.3	1.600	1.806	0.190	0.0	85	1.899
7.000	1.002	7.9	4.5	0.600	0.922	0.025	0.0	54	1.036
1.012	2.493	176.2	35.4	1.806	1.826	0.216	0.0	91	1.961
8.000	1.002	7.9	1.6	0.600	0.710	0.009	0.0	31	0.789
1.013	3.531	249.6	36.8	1.826	1.909	0.225	0.0	77	2.546
5.000	1.005	7.9	2.7	0.600	0.645	0.015	0.0	40	0.910

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.000	TEST TANK	SW3	2.512	0.600	98.600	98.557	0.043	58.4	150	5.03	49.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.000	1.318	23.3	0.0	1.250	0.893	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	11.428	40.0	100	Circular	100.000	99.300	0.600	99.900	99.014	0.786
2.000	8.579	30.0	100	Circular	100.000	99.300	0.600	99.900	99.014	0.786
1.001	6.577	16.2	150	Circular	99.900	98.964	0.786	99.600	98.557	0.893
1.002	3.726	18.6	225	Circular	99.600	98.000	1.375	98.750	97.800	0.725
1.003	5.046	50.5	225	Circular	98.750	97.800	0.725	98.600	97.700	0.675
1.004	13.812	80.0	225	Circular	98.600	97.700	0.675	98.400	97.527	0.648
1.005	12.979	80.0	225	Circular	98.400	97.527	0.648	98.400	97.365	0.810
1.006	5.044	60.0	225	Circular	98.400	97.365	0.810	98.400	97.281	0.894
1.007	12.148	60.0	225	Circular	98.400	97.281	0.894	98.350	97.079	1.046
1.008	18.483	60.0	225	Circular	98.350	97.079	1.046	98.400	96.771	1.404
1.009	7.501	80.0	225	Circular	98.400	96.771	1.404	98.500	96.677	1.598
1.010	6.719	87.3	300	Circular	98.500	96.677	1.523	98.500	96.600	1.600
6.000	6.410	59.3	100	Circular	98.300	97.600	0.600	98.500	97.492	0.908
4.000	9.758	40.0	100	Circular	100.300	99.600	0.600	100.200	99.356	0.744
4.001	14.879	32.6	100	Circular	100.200	99.356	0.744	100.100	98.900	1.100
5.001	7.281	12.1	100	Circular	100.200	99.455	0.645	100.100	98.855	1.145
4.002	14.698	10.5	150	Circular	100.100	98.805	1.145	98.550	97.405	0.995
4.003	5.987	9.1	150	Circular	98.550	97.405	0.995	98.500	96.750	1.600
1.011	6.252	40.0	300	Circular	98.500	96.600	1.600	98.550	96.444	1.806

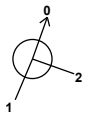
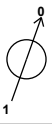
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW1	320	Manhole	Inspection Chamber	RG1		Junction	
2.000	SW2	320	Manhole	Inspection Chamber	RG1		Junction	
1.001	RG1		Junction		SW3	1500	Manhole	Inspection Chamber
1.002	SW3	1500	Manhole	Inspection Chamber	SW4	480	Manhole	Inspection Chamber
1.003	SW4	480	Manhole	Inspection Chamber	RG2		Junction	
1.004	RG2		Junction		RG3		Junction	
1.005	RG3		Junction		RG4		Junction	
1.006	RG4		Junction		SW5	600	Manhole	Inspection Chamber
1.007	SW5	600	Manhole	Inspection Chamber	SW6	600	Manhole	Inspection Chamber
1.008	SW6	600	Manhole	Inspection Chamber	SW7	600	Manhole	Inspection Chamber
1.009	SW7	600	Manhole	Inspection Chamber	SW8	600	Manhole	Inspection Chamber
1.010	SW8	600	Manhole	Inspection Chamber	TANK		Junction	
6.000	RG5		Junction		TANK		Junction	
4.000	SW9	320	Manhole	Inspection Chamber	SW10	480	Manhole	Inspection Chamber
4.001	SW10	480	Manhole	Inspection Chamber	SW12	600	Manhole	Inspection Chamber
5.001	SW11	320	Manhole	Inspection Chamber	SW12	600	Manhole	Inspection Chamber
4.002	SW12	600	Manhole	Inspection Chamber	SW13	600	Manhole	Inspection Chamber
4.003	SW13	600	Manhole	Inspection Chamber	TANK		Junction	
1.011	TANK		Junction		SW14	1050	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
7.000	4.269	59.3	100	Circular	98.300	97.600	0.600	98.550	97.528	0.922
1.012	2.789	40.0	300	Circular	98.550	96.444	1.806	98.500	96.374	1.826
8.000	6.522	59.3	100	Circular	98.500	97.800	0.600	98.500	97.690	0.710
1.013	4.658	20.0	300	Circular	98.500	96.374	1.826	98.350	96.141	1.909
5.000	2.650	58.9	100	Circular	100.200	99.500	0.600	100.200	99.455	0.645
3.000	2.512	58.4	150	Circular	100.000	98.600	1.250	99.600	98.557	0.893

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
7.000	P1		Junction		SW14	1050	Manhole	Adoptable
1.012	SW14	1050	Manhole	Adoptable	SW15	1800	Manhole	Adoptable
8.000	P2		Junction		SW15	1800	Manhole	Adoptable
1.013	SW15	1800	Manhole	Adoptable	SW16-OUTFALL	1200	Manhole	Adoptable
5.000	RG6		Junction		SW11	320	Manhole	Inspection Chamber
3.000	TEST TANK		Junction		SW3	1500	Manhole	Inspection Chamber

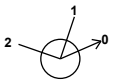
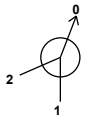
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW1	258646.603	196170.198	100.000	0.700	320				
						0	1.000	99.300	100
SW2	258632.964	196165.935	100.000	0.700	320				
						0	2.000	99.300	100
RG1	258635.833	196174.020	99.900	0.936			1	2.000	99.014	100
							2	1.000	99.014	100
						0	1.001	98.964	150
SW3	258629.634	196176.219	99.600	1.600	1500		1	3.000	98.557	150
							2	1.001	98.557	150
						0	1.002	98.000	225
SW4	258630.881	196179.730	98.750	0.950	480		1	1.002	97.800	225
						0	1.003	97.800	225
RG2	258632.569	196184.485	98.600	0.900			1	1.003	97.700	225
						0	1.004	97.700	225
RG3	258637.188	196197.502	98.400	0.873			1	1.004	97.527	225
										
						0	1.005	97.527	225
RG4	258649.420	196193.162	98.400	1.035			1	1.005	97.365	225
						0	1.006	97.365	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW5	258651.107	196197.916	98.400	1.119	600	1	1.006	97.281	225
						0	1.007	97.281	225
SW6	258663.235	196197.214	98.350	1.271	600	1	1.007	97.079	225
						0	1.008	97.079	225
SW7	258680.654	196191.032	98.400	1.629	600	1	1.008	96.771	225
						0	1.009	96.771	225
SW8	258678.138	196183.966	98.500	1.823	600	1	1.009	96.677	225
						0	1.010	96.677	300
RG5	258680.656	196186.900	98.300	0.700		0	6.000	97.600	100
SW9	258692.551	196147.102	100.300	0.700	320	0	4.000	99.600	100
SW10	258691.451	196156.798	100.200	0.844	480	1	4.000	99.356	100
						0	4.001	99.356	100
RG6	258669.836	196162.123	100.200	0.700		0	5.000	99.500	100
SW11	258670.722	196164.621	100.200	0.745	320	1	5.000	99.455	100
						0	5.001	99.455	100
SW12	258677.607	196162.251	100.100	1.295	600	1	5.001	98.855	100
						2	4.001	98.900	100
						0	4.002	98.805	150
SW13	258682.522	196176.103	98.550	1.145	600	1	4.002	97.405	150
						0	4.003	97.405	150
TANK	258684.484	196181.759	98.500	1.900		1	6.000	97.492	100
						2	4.003	96.750	150
						3	1.010	96.600	300
						0	1.011	96.600	300
P1	258691.742	196183.755	98.300	0.700		0	7.000	97.600	100

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW14	258690.389	196179.706	98.550	2.106	1050		1	7.000	97.528	100
							2	1.011	96.444	300
							0	1.012	96.444	300
P2	258692.944	196174.299	98.500	0.700			0	8.000	97.800	100
SW15	258692.945	196180.821	98.500	2.126	1800		1	8.000	97.690	100
							2	1.012	96.374	300
							0	1.013	96.374	300
SW16-OUTFALL	258694.621	196185.167	98.350	2.209	1200		1	1.013	96.141	300
TEST TANK	258628.654	196173.906	100.000	1.400			0	3.000	98.600	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	20.0		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	40	10	0
30	40	10	0
100	40	10	0
200	40	10	0
1000	0	0	0

Node SW15 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.013	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0163-1500-1800-1500
Invert Level (m)	96.374	Min Outlet Diameter (m)	0.225
Design Depth (m)	1.800	Min Node Diameter (mm)	1800
Design Flow (l/s)	15.0		

Node SW3 Online Orifice Control

Flap Valve	x	Invert Level (m)	98.000	Diameter (m)	0.074
Downstream Link	1.002	Design Depth (m)	0.800	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	10.0		

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	96.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	102

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	44.0	0.0	1.200	44.0	0.0	1.201	0.0	0.0

Node RG1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	98.964
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.40	Time to half empty (mins)	3

Depth (m)	Area (m²)	Inf Area (m²)
0.000	18.6	0.0

Node RG2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	97.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.40	Time to half empty (mins)	34

Depth (m)	Area (m²)	Inf Area (m²)
0.000	2.5	0.0

Node RG3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	97.527
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.40	Time to half empty (mins)	44

Depth (m)	Area (m²)	Inf Area (m²)
0.000	13.0	0.0

Node RG4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	97.365
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.40	Time to half empty (mins)	53

Depth (m)	Area (m²)	Inf Area (m²)
0.000	7.0	0.0

Node RG5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	97.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.40	Time to half empty (mins)	47

Depth (m)	Area (m²)	Inf Area (m²)
0.000	9.0	0.0

Node P2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	97.800	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	34	Depth (m)	0.420
Safety Factor	2.0	Width (m)	5.300	Inf Depth (m)	
Porosity	0.30	Length (m)	4.000		

Node P1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	97.600	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	48	Depth (m)	0.420
Safety Factor	2.0	Width (m)	12.400	Inf Depth (m)	
Porosity	0.30	Length (m)	5.000		

Node RG6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.40	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)
0.000	7.2	0.0

Node TEST TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.5	Invert Level (m)	98.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	16

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	6.0	0.0	0.800	6.0	0.0	0.801	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year +40% CC +10% A 15 minute summer	146.449	41.440
2 year +40% CC +10% A 15 minute winter	102.771	41.440
2 year +40% CC +10% A 30 minute summer	99.759	28.228
2 year +40% CC +10% A 30 minute winter	70.006	28.228
2 year +40% CC +10% A 60 minute summer	69.928	18.480
2 year +40% CC +10% A 60 minute winter	46.459	18.480
2 year +40% CC +10% A 120 minute summer	51.387	13.580
2 year +40% CC +10% A 120 minute winter	34.140	13.580
2 year +40% CC +10% A 180 minute summer	42.751	11.001
2 year +40% CC +10% A 180 minute winter	27.789	11.001
2 year +40% CC +10% A 240 minute summer	35.449	9.368
2 year +40% CC +10% A 240 minute winter	23.551	9.368
2 year +40% CC +10% A 360 minute summer	28.577	7.354
2 year +40% CC +10% A 360 minute winter	18.576	7.354
2 year +40% CC +10% A 480 minute summer	23.188	6.128
2 year +40% CC +10% A 480 minute winter	15.406	6.128
2 year +40% CC +10% A 600 minute summer	19.338	5.289
2 year +40% CC +10% A 600 minute winter	13.213	5.289
2 year +40% CC +10% A 720 minute summer	17.439	4.674
2 year +40% CC +10% A 720 minute winter	11.720	4.674

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year +40% CC +10% A 960 minute summer	14.503	3.819
2 year +40% CC +10% A 960 minute winter	9.607	3.819
2 year +40% CC +10% A 1440 minute summer	10.661	2.857
2 year +40% CC +10% A 1440 minute winter	7.165	2.857
30 year +40% CC +10% A 15 minute summer	337.655	95.545
30 year +40% CC +10% A 15 minute winter	236.951	95.545
30 year +40% CC +10% A 30 minute summer	234.602	66.384
30 year +40% CC +10% A 30 minute winter	164.633	66.384
30 year +40% CC +10% A 60 minute summer	167.412	44.242
30 year +40% CC +10% A 60 minute winter	111.225	44.242
30 year +40% CC +10% A 120 minute summer	106.442	28.129
30 year +40% CC +10% A 120 minute winter	70.717	28.129
30 year +40% CC +10% A 180 minute summer	83.221	21.416
30 year +40% CC +10% A 180 minute winter	54.096	21.416
30 year +40% CC +10% A 240 minute summer	66.569	17.592
30 year +40% CC +10% A 240 minute winter	44.227	17.592
30 year +40% CC +10% A 360 minute summer	51.572	13.271
30 year +40% CC +10% A 360 minute winter	33.523	13.271
30 year +40% CC +10% A 480 minute summer	40.933	10.817
30 year +40% CC +10% A 480 minute winter	27.195	10.817
30 year +40% CC +10% A 600 minute summer	33.676	9.211
30 year +40% CC +10% A 600 minute winter	23.009	9.211
30 year +40% CC +10% A 720 minute summer	30.100	8.067
30 year +40% CC +10% A 720 minute winter	20.229	8.067
30 year +40% CC +10% A 960 minute summer	24.798	6.530
30 year +40% CC +10% A 960 minute winter	16.427	6.530
30 year +40% CC +10% A 1440 minute summer	18.029	4.832
30 year +40% CC +10% A 1440 minute winter	12.117	4.832
100 year +40% CC +10% A 15 minute summer	412.583	116.747
100 year +40% CC +10% A 15 minute winter	289.532	116.747
100 year +40% CC +10% A 30 minute summer	290.972	82.335
100 year +40% CC +10% A 30 minute winter	204.191	82.335
100 year +40% CC +10% A 60 minute summer	209.643	55.403
100 year +40% CC +10% A 60 minute winter	139.282	55.403
100 year +40% CC +10% A 120 minute summer	129.798	34.302
100 year +40% CC +10% A 120 minute winter	86.235	34.302
100 year +40% CC +10% A 180 minute summer	100.349	25.823
100 year +40% CC +10% A 180 minute winter	65.229	25.823
100 year +40% CC +10% A 240 minute summer	79.820	21.094
100 year +40% CC +10% A 240 minute winter	53.030	21.094
100 year +40% CC +10% A 360 minute summer	61.611	15.855
100 year +40% CC +10% A 360 minute winter	40.049	15.855
100 year +40% CC +10% A 480 minute summer	48.924	12.929
100 year +40% CC +10% A 480 minute winter	32.504	12.929
100 year +40% CC +10% A 600 minute summer	40.317	11.028
100 year +40% CC +10% A 600 minute winter	27.547	11.028
100 year +40% CC +10% A 720 minute summer	36.113	9.679
100 year +40% CC +10% A 720 minute winter	24.270	9.679
100 year +40% CC +10% A 960 minute summer	29.886	7.870
100 year +40% CC +10% A 960 minute winter	19.797	7.870
100 year +40% CC +10% A 1440 minute summer	21.861	5.859
100 year +40% CC +10% A 1440 minute winter	14.692	5.859

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
200 year +40% CC +10% A 15 minute summer	458.007	129.600
200 year +40% CC +10% A 15 minute winter	321.408	129.600
200 year +40% CC +10% A 30 minute summer	324.151	91.724
200 year +40% CC +10% A 30 minute winter	227.474	91.724
200 year +40% CC +10% A 60 minute summer	235.124	62.136
200 year +40% CC +10% A 60 minute winter	156.211	62.136
200 year +40% CC +10% A 120 minute summer	143.990	38.052
200 year +40% CC +10% A 120 minute winter	95.664	38.052
200 year +40% CC +10% A 180 minute summer	110.860	28.528
200 year +40% CC +10% A 180 minute winter	72.062	28.528
200 year +40% CC +10% A 240 minute summer	88.048	23.269
200 year +40% CC +10% A 240 minute winter	58.497	23.269
200 year +40% CC +10% A 360 minute summer	68.023	17.505
200 year +40% CC +10% A 360 minute winter	44.217	17.505
200 year +40% CC +10% A 480 minute summer	54.203	14.324
200 year +40% CC +10% A 480 minute winter	36.011	14.324
200 year +40% CC +10% A 600 minute summer	44.827	12.261
200 year +40% CC +10% A 600 minute winter	30.628	12.261
200 year +40% CC +10% A 720 minute summer	40.283	10.796
200 year +40% CC +10% A 720 minute winter	27.073	10.796
200 year +40% CC +10% A 960 minute summer	33.506	8.823
200 year +40% CC +10% A 960 minute winter	22.195	8.823
200 year +40% CC +10% A 1440 minute summer	24.621	6.599
200 year +40% CC +10% A 1440 minute winter	16.547	6.599
1000 year 15 minute summer	404.442	114.443
1000 year 15 minute winter	283.819	114.443
1000 year 30 minute summer	291.648	82.526
1000 year 30 minute winter	204.665	82.526
1000 year 60 minute summer	214.202	56.607
1000 year 60 minute winter	142.311	56.607
1000 year 120 minute summer	129.597	34.249
1000 year 120 minute winter	86.101	34.249
1000 year 180 minute summer	99.712	25.659
1000 year 180 minute winter	64.815	25.659
1000 year 240 minute summer	79.449	20.996
1000 year 240 minute winter	52.784	20.996
1000 year 360 minute summer	62.099	15.980
1000 year 360 minute winter	40.366	15.980
1000 year 480 minute summer	50.010	13.216
1000 year 480 minute winter	33.225	13.216
1000 year 600 minute summer	41.676	11.399
1000 year 600 minute winter	28.475	11.399
1000 year 720 minute summer	37.649	10.090
1000 year 720 minute winter	25.303	10.090
1000 year 960 minute summer	31.456	8.283
1000 year 960 minute winter	20.837	8.283
1000 year 1440 minute summer	23.071	6.183
1000 year 1440 minute winter	15.505	6.183

Results for 2 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1	10	99.355	0.055	5.5	0.0410	0.0000	OK
15 minute summer	SW2	10	99.339	0.039	3.4	0.0190	0.0000	OK
15 minute summer	RG1	11	99.016	0.052	10.8	0.3979	0.0000	OK
15 minute summer	SW3	13	98.583	0.583	10.7	1.0304	0.0000	SURCHARGED
15 minute summer	SW4	11	97.877	0.077	16.1	0.0725	0.0000	OK
15 minute summer	RG2	11	97.785	0.085	18.0	0.1020	0.0000	OK
15 minute summer	RG3	11	97.619	0.092	20.9	0.5062	0.0000	OK
15 minute summer	RG4	11	97.461	0.096	21.8	0.2768	0.0000	OK
15 minute summer	SW5	11	97.375	0.094	21.7	0.0266	0.0000	OK
15 minute summer	SW6	11	97.181	0.102	26.6	0.0638	0.0000	OK
120 minute summer	SW7	76	96.933	0.162	18.9	0.0722	0.0000	OK
120 minute summer	SW8	76	96.932	0.255	19.7	0.0906	0.0000	OK
15 minute summer	RG5	11	97.641	0.041	2.8	0.1602	0.0000	OK
15 minute summer	SW9	11	99.629	0.029	1.8	0.0088	0.0000	OK
15 minute summer	SW10	10	99.400	0.044	4.1	0.0183	0.0000	OK
15 minute summer	RG6	10	99.554	0.054	4.0	0.1801	0.0000	OK
15 minute summer	SW11	11	99.489	0.034	3.9	0.0027	0.0000	OK
15 minute summer	SW12	10	98.849	0.044	10.1	0.0188	0.0000	OK
15 minute summer	SW13	11	97.451	0.046	11.1	0.0163	0.0000	OK
120 minute summer	TANK	76	96.931	0.331	50.5	13.8282	0.0000	SURCHARGED
15 minute summer	P1	11	97.671	0.071	6.7	0.4323	0.0000	OK
120 minute summer	SW14	76	96.930	0.486	44.7	0.4205	0.0000	SURCHARGED
15 minute summer	P2	10	97.838	0.038	2.4	0.0608	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1	1.000	RG1	5.5	1.244	0.568	0.0501	
15 minute summer	SW2	2.000	RG1	3.4	1.224	0.304	0.0237	
15 minute summer	RG1	1.001	SW3	10.7	2.016	0.240	0.0349	
15 minute summer	SW3	Orifice	SW4	8.5				
15 minute summer	SW4	1.003	RG2	16.0	1.245	0.219	0.0650	
15 minute summer	RG2	1.004	RG3	18.0	1.237	0.309	0.2009	
15 minute summer	RG3	1.005	RG4	20.7	1.323	0.357	0.2035	
15 minute summer	RG4	1.006	SW5	21.7	1.371	0.323	0.0800	
15 minute summer	SW5	1.007	SW6	21.6	1.326	0.322	0.2006	
15 minute summer	SW6	1.008	SW7	26.5	1.300	0.394	0.3772	
120 minute summer	SW7	1.009	SW8	18.9	1.169	0.324	0.2641	
120 minute summer	SW8	1.010	TANK	22.9	1.115	0.193	0.4512	
15 minute summer	RG5	6.000	TANK	2.7	0.914	0.347	0.0192	
15 minute summer	SW9	4.000	SW10	1.8	0.696	0.187	0.0256	
15 minute summer	SW10	4.001	SW12	4.1	1.240	0.381	0.0487	
15 minute summer	RG6	5.000	SW11	3.9	1.190	0.492	0.0087	
15 minute summer	SW11	5.001	SW12	3.9	1.740	0.222	0.0163	
15 minute summer	SW12	4.002	SW13	10.1	2.267	0.182	0.0653	
15 minute summer	SW13	4.003	TANK	11.1	2.507	0.187	0.0498	
120 minute summer	TANK	1.011	SW14	41.5	1.113	0.236	0.4403	
15 minute summer	P1	7.000	SW14	6.1	1.066	0.771	0.0243	
120 minute summer	SW14	1.012	SW15	34.3	0.578	0.194	0.1964	
15 minute summer	P2	8.000	SW15	2.3	0.861	0.297	0.0177	

Results for 2 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	SW15	76	96.928	0.554	35.1	1.4100	0.0000	SURCHARGED
15 minute summer	SW16-OUTFALL	1	96.141	0.000	15.0	0.0000	0.0000	OK
15 minute summer	TEST TANK	1	98.600	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	SW15	Hydro-Brake®	SW16-OUTFALL	15.0				67.1
15 minute summer	TEST TANK	3.000	SW3	0.0	0.000	0.000	0.0026	

Results for 30 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1	11	99.598	0.298	12.7	0.2208	0.0000	SURCHARGED
15 minute summer	SW2	10	99.365	0.065	7.9	0.0316	0.0000	OK
30 minute summer	RG1	21	99.073	0.109	23.3	0.8327	0.0000	OK
30 minute summer	SW3	22	99.049	1.049	21.7	1.8538	0.0000	SURCHARGED
15 minute summer	SW4	10	97.912	0.112	29.6	0.1057	0.0000	OK
15 minute summer	RG2	10	97.824	0.124	34.4	0.1483	0.0000	OK
60 minute summer	RG3	49	97.799	0.272	34.1	1.4898	0.0000	SURCHARGED
60 minute summer	RG4	50	97.793	0.428	36.0	1.2395	0.0000	SURCHARGED
60 minute summer	SW5	50	97.790	0.509	34.6	0.1440	0.0000	SURCHARGED
60 minute summer	SW6	51	97.783	0.704	43.2	0.4427	0.0000	SURCHARGED
120 minute summer	SW7	86	97.777	1.006	34.6	0.4477	0.0000	SURCHARGED
120 minute summer	SW8	88	97.774	1.097	35.7	0.3895	0.0000	SURCHARGED
120 minute summer	RG5	88	97.774	0.174	3.4	0.6872	0.0000	SURCHARGED
15 minute summer	SW9	10	99.646	0.046	4.2	0.0139	0.0000	OK
15 minute summer	SW10	10	99.434	0.078	9.6	0.0324	0.0000	OK
15 minute summer	RG6	11	99.606	0.106	9.3	0.3562	0.0000	SURCHARGED
15 minute summer	SW11	11	99.509	0.054	8.8	0.0043	0.0000	OK
15 minute summer	SW12	10	98.876	0.071	23.1	0.0303	0.0000	OK
120 minute summer	SW13	88	97.775	0.370	13.6	0.1318	0.0000	SURCHARGED
120 minute summer	TANK	88	97.774	1.174	51.6	49.0630	0.0000	SURCHARGED
120 minute summer	P1	88	97.775	0.175	7.9	2.2469	0.0000	SURCHARGED
120 minute summer	SW14	88	97.773	1.329	48.4	1.1507	0.0000	SURCHARGED
15 minute summer	P2	11	97.863	0.063	5.5	0.1479	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1	1.000	RG1	12.0	1.529	1.246	0.0885	
15 minute summer	SW2	2.000	RG1	7.8	1.497	0.705	0.0449	
30 minute summer	RG1	1.001	SW3	21.7	2.192	0.488	0.1031	
30 minute summer	SW3	Orifice	SW4	11.5				
15 minute summer	SW4	1.003	RG2	29.5	1.402	0.402	0.1065	
15 minute summer	RG2	1.004	RG3	34.2	1.424	0.588	0.3316	
60 minute summer	RG3	1.005	RG4	33.9	1.456	0.582	0.5162	
60 minute summer	RG4	1.006	SW5	34.6	1.478	0.514	0.2006	
60 minute summer	SW5	1.007	SW6	34.0	1.404	0.506	0.4831	
60 minute summer	SW6	1.008	SW7	39.6	1.275	0.590	0.7351	
120 minute summer	SW7	1.009	SW8	33.8	1.190	0.581	0.2983	
120 minute summer	SW8	1.010	TANK	34.7	1.073	0.292	0.4731	
120 minute summer	RG5	6.000	TANK	3.4	0.968	0.432	0.0502	
15 minute summer	SW9	4.000	SW10	4.2	0.833	0.436	0.0494	
15 minute summer	SW10	4.001	SW12	9.4	1.480	0.885	0.0948	
15 minute summer	RG6	5.000	SW11	8.8	1.390	1.109	0.0161	
15 minute summer	SW11	5.001	SW12	8.7	2.124	0.499	0.0300	
15 minute summer	SW12	4.002	SW13	23.1	2.868	0.417	0.1182	
120 minute summer	SW13	4.003	TANK	13.5	2.248	0.228	0.1054	
120 minute summer	TANK	1.011	SW14	44.3	1.136	0.251	0.4403	
120 minute summer	P1	7.000	SW14	7.5	1.096	0.957	0.0334	
120 minute summer	SW14	1.012	SW15	40.9	0.607	0.232	0.1964	
15 minute summer	P2	8.000	SW15	5.3	1.051	0.675	0.0330	

Results for 30 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	SW15	88	97.772	1.398	42.5	3.5567	0.0000	SURCHARGED
15 minute summer	SW16-OUTFALL	1	96.141	0.000	15.0	0.0000	0.0000	OK
30 minute summer	TEST TANK	22	99.050	0.450	9.7	2.5627	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	SW15	Hydro-Brake®	SW16-OUTFALL	15.0				139.1
30 minute summer	TEST TANK	3.000	SW3	-9.7	-0.925	-0.417	0.0442	

Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1	11	99.809	0.509	15.6	0.3768	0.0000	FLOOD RISK
15 minute summer	SW2	10	99.375	0.075	9.6	0.0368	0.0000	OK
30 minute summer	RG1	22	99.218	0.254	28.6	1.9362	0.0000	SURCHARGED
30 minute summer	SW3	23	99.173	1.173	24.6	2.0733	0.0000	SURCHARGED
60 minute summer	SW4	58	98.320	0.520	29.9	0.4891	0.0000	SURCHARGED
60 minute summer	RG2	59	98.318	0.618	34.4	0.7395	0.0000	FLOOD RISK
60 minute summer	RG3	59	98.316	0.789	40.4	4.3279	0.0000	FLOOD RISK
60 minute summer	RG4	59	98.313	0.948	42.3	2.7445	0.0000	FLOOD RISK
60 minute summer	SW5	59	98.311	1.030	36.3	0.2914	0.0000	FLOOD RISK
60 minute summer	SW6	59	98.306	1.227	43.5	0.7719	0.0000	FLOOD RISK
60 minute summer	SW7	60	98.299	1.528	47.6	0.6798	0.0000	FLOOD RISK
60 minute summer	SW8	60	98.294	1.617	49.7	0.5741	0.0000	FLOOD RISK
60 minute summer	RG5	60	98.294	0.694	7.0	2.7353	0.0000	FLOOD RISK
15 minute summer	SW9	10	99.652	0.052	5.2	0.0157	0.0000	OK
15 minute summer	SW10	11	99.532	0.176	11.8	0.0729	0.0000	SURCHARGED
15 minute summer	RG6	11	99.649	0.149	11.3	0.4991	0.0000	SURCHARGED
15 minute summer	SW11	11	99.516	0.061	10.6	0.0049	0.0000	OK
15 minute summer	SW12	11	98.882	0.077	27.1	0.0326	0.0000	OK
60 minute summer	SW13	60	98.295	0.890	24.7	0.3168	0.0000	FLOOD RISK
60 minute summer	TANK	60	98.293	1.693	77.7	50.1809	0.0000	FLOOD RISK
60 minute summer	P1	60	98.295	0.695	14.6	7.2199	0.0000	FLOOD RISK
60 minute summer	SW14	60	98.292	1.848	39.0	1.6003	0.0000	FLOOD RISK
60 minute summer	P2	60	98.291	0.491	5.6	2.5003	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW1	1.000	RG1	14.3	1.828	1.489	0.0894	
15 minute summer	SW2	2.000	RG1	9.5	1.547	0.857	0.0552	
30 minute summer	RG1	1.001	SW3	24.6	2.137	0.552	0.1158	
30 minute summer	SW3	Orifice	SW4	12.2				
60 minute summer	SW4	1.003	RG2	29.8	1.408	0.406	0.2007	
60 minute summer	RG2	1.004	RG3	33.8	1.410	0.581	0.5493	
60 minute summer	RG3	1.005	RG4	39.7	1.461	0.683	0.5162	
60 minute summer	RG4	1.006	SW5	36.3	1.484	0.540	0.2006	
60 minute summer	SW5	1.007	SW6	33.7	1.427	0.502	0.4831	
60 minute summer	SW6	1.008	SW7	41.1	1.247	0.612	0.7351	
60 minute summer	SW7	1.009	SW8	46.4	1.200	0.798	0.2983	
60 minute summer	SW8	1.010	TANK	48.1	1.257	0.405	0.4731	
60 minute summer	RG5	6.000	TANK	6.2	1.112	0.785	0.0502	
15 minute summer	SW9	4.000	SW10	5.2	0.841	0.537	0.0584	
15 minute summer	SW10	4.001	SW12	10.7	1.497	1.003	0.1164	
15 minute summer	RG6	5.000	SW11	10.6	1.481	1.337	0.0170	
15 minute summer	SW11	5.001	SW12	10.5	2.210	0.601	0.0347	
15 minute summer	SW12	4.002	SW13	27.2	2.941	0.491	0.1462	
60 minute summer	SW13	4.003	TANK	23.8	2.329	0.401	0.1054	
60 minute summer	TANK	1.011	SW14	35.2	1.109	0.200	0.4403	
60 minute summer	P1	7.000	SW14	10.4	1.329	1.322	0.0334	
60 minute summer	SW14	1.012	SW15	31.8	0.634	0.180	0.1964	
60 minute summer	P2	8.000	SW15	5.2	1.044	0.656	0.0510	

Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW15	60	98.290	1.916	33.5	4.8769	0.0000	FLOOD RISK
15 minute summer	SW16-OUTFALL	1	96.141	0.000	15.0	0.0000	0.0000	OK
30 minute summer	TEST TANK	23	99.174	0.574	10.6	3.2710	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW15	Hydro-Brake®	SW16-OUTFALL	15.5				137.2
30 minute summer	TEST TANK	3.000	SW3	-10.6	-1.161	-0.456	0.0442	

Results for 200 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	SW1	19	99.983	0.683	16.8	0.5053	0.0000	FLOOD RISK
30 minute summer	SW2	19	99.384	0.084	10.4	0.0409	0.0000	OK
30 minute summer	RG1	22	99.303	0.339	31.4	2.5803	0.0000	SURCHARGED
60 minute summer	SW3	40	99.257	1.257	22.1	2.2211	0.0000	SURCHARGED
60 minute summer	SW4	43	98.418	0.618	32.5	0.5820	0.0000	SURCHARGED
60 minute summer	RG2	43	98.412	0.712	37.0	0.8515	0.0000	FLOOD RISK
60 minute summer	RG3	44	98.397	0.870	43.8	4.7750	0.0000	FLOOD RISK
60 minute summer	RG4	44	98.381	1.016	42.7	2.9433	0.0000	FLOOD RISK
60 minute summer	SW5	44	98.372	1.091	36.6	0.3087	0.0000	FLOOD RISK
60 minute summer	SW6	43	98.350	1.271	42.7	0.7995	2.6285	FLOOD
60 minute summer	SW7	43	98.339	1.568	49.2	0.6976	0.0000	FLOOD RISK
60 minute summer	SW8	43	98.331	1.654	51.5	0.5871	0.0000	FLOOD RISK
60 minute summer	RG5	42	98.300	0.700	10.4	2.7573	4.4580	FLOOD
15 minute summer	SW9	11	99.681	0.081	5.8	0.0242	0.0000	OK
15 minute summer	SW10	11	99.618	0.262	12.7	0.1080	0.0000	SURCHARGED
15 minute summer	RG6	11	99.676	0.176	12.6	0.5920	0.0000	SURCHARGED
15 minute summer	SW11	11	99.521	0.066	11.7	0.0052	0.0000	OK
15 minute summer	SW12	10	98.886	0.081	29.8	0.0343	0.0000	OK
60 minute summer	SW13	43	98.343	0.938	27.6	0.3340	0.0000	FLOOD RISK
60 minute summer	TANK	43	98.329	1.729	81.9	50.1809	0.0000	FLOOD RISK
60 minute summer	P1	42	98.300	0.700	18.2	7.2237	5.9592	FLOOD
60 minute summer	SW14	43	98.327	1.883	48.4	1.6308	0.0000	FLOOD RISK
60 minute summer	P2	43	98.331	0.531	9.3	2.5116	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	SW1	1.000	RG1	14.9	1.904	1.551	0.0894	
30 minute summer	SW2	2.000	RG1	10.4	1.555	0.937	0.0636	
30 minute summer	RG1	1.001	SW3	25.6	2.198	0.575	0.1158	
60 minute summer	SW3	Orifice	SW4	11.7				
60 minute summer	SW4	1.003	RG2	31.8	1.405	0.434	0.2007	
60 minute summer	RG2	1.004	RG3	36.4	1.409	0.625	0.5493	
60 minute summer	RG3	1.005	RG4	39.9	1.481	0.686	0.5162	
60 minute summer	RG4	1.006	SW5	36.6	1.481	0.545	0.2006	
60 minute summer	SW5	1.007	SW6	32.7	1.417	0.486	0.4831	
60 minute summer	SW6	1.008	SW7	41.5	1.229	0.617	0.7351	
60 minute summer	SW7	1.009	SW8	47.6	1.198	0.819	0.2983	
60 minute summer	SW8	1.010	TANK	49.7	1.264	0.418	0.4731	
60 minute summer	RG5	6.000	TANK	7.0	1.134	0.884	0.0502	
15 minute summer	SW9	4.000	SW10	5.4	0.855	0.559	0.0711	
15 minute summer	SW10	4.001	SW12	11.6	1.488	1.094	0.1164	
15 minute summer	RG6	5.000	SW11	11.7	1.602	1.477	0.0176	
15 minute summer	SW11	5.001	SW12	11.6	2.253	0.664	0.0376	
15 minute summer	SW12	4.002	SW13	29.8	2.948	0.540	0.1716	
60 minute summer	SW13	4.003	TANK	25.4	2.265	0.429	0.1054	
60 minute summer	TANK	1.011	SW14	44.9	1.115	0.255	0.4403	
60 minute summer	P1	7.000	SW14	10.9	1.393	1.385	0.0334	
60 minute summer	SW14	1.012	SW15	34.3	0.643	0.195	0.1964	
60 minute summer	P2	8.000	SW15	-6.2	1.067	-0.794	0.0510	

Results for 200 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW15	43	98.326	1.952	35.6	4.9672	0.0000	FLOOD RISK
15 minute summer	SW16-OUTFALL	1	96.141	0.000	15.0	0.0000	0.0000	OK
60 minute summer	TEST TANK	40	99.257	0.657	8.4	3.7460	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW15	Hydro-Brake®	SW16-OUTFALL	15.6				141.0
60 minute summer	TEST TANK	3.000	SW3	-8.4	-0.724	-0.360	0.0442	

Results for 1000 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	SW1	19	99.680	0.380	13.7	0.2582	0.0000	SURCHARGED
15 minute summer	SW2	10	99.369	0.069	8.6	0.0311	0.0000	OK
30 minute summer	RG1	22	99.154	0.190	26.3	1.4408	0.0000	SURCHARGED
30 minute summer	SW3	23	99.108	1.108	23.2	1.9582	0.0000	SURCHARGED
60 minute summer	SW4	55	98.077	0.277	28.2	0.2412	0.0000	SURCHARGED
60 minute summer	RG2	55	98.075	0.375	32.5	0.4423	0.0000	SURCHARGED
60 minute summer	RG3	56	98.073	0.546	38.5	2.9824	0.0000	SURCHARGED
60 minute summer	RG4	56	98.071	0.706	40.8	2.0373	0.0000	SURCHARGED
60 minute summer	SW5	56	98.069	0.788	37.5	0.2230	0.0000	SURCHARGED
60 minute summer	SW6	57	98.066	0.987	47.2	0.5890	0.0000	FLOOD RISK
60 minute summer	SW7	57	98.059	1.288	47.0	0.5539	0.0000	SURCHARGED
60 minute summer	SW8	57	98.055	1.378	48.7	0.4811	0.0000	SURCHARGED
60 minute summer	RG5	58	98.056	0.456	5.8	1.7817	0.0000	FLOOD RISK
30 minute summer	SW9	18	99.649	0.049	4.6	0.0137	0.0000	OK
15 minute summer	SW10	10	99.442	0.086	10.5	0.0336	0.0000	OK
15 minute summer	RG6	11	99.623	0.123	10.1	0.4079	0.0000	SURCHARGED
30 minute summer	SW11	19	99.512	0.057	9.5	0.0046	0.0000	OK
15 minute summer	SW12	10	98.879	0.074	24.9	0.0306	0.0000	OK
60 minute summer	SW13	58	98.056	0.651	23.0	0.2273	0.0000	SURCHARGED
60 minute summer	TANK	57	98.055	1.455	74.7	50.1809	0.0000	SURCHARGED
60 minute summer	P1	57	98.057	0.457	13.6	6.9966	0.0000	FLOOD RISK
60 minute summer	SW14	57	98.054	1.609	50.8	1.3938	0.0000	SURCHARGED
60 minute summer	P2	57	98.053	0.253	4.8	1.3615	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	SW1	1.000	RG1	12.9	1.653	1.347	0.0894	
15 minute summer	SW2	2.000	RG1	8.5	1.521	0.768	0.0481	
30 minute summer	RG1	1.001	SW3	23.2	2.084	0.522	0.1158	
30 minute summer	SW3	Orifice	SW4	11.8				
60 minute summer	SW4	1.003	RG2	28.2	1.393	0.384	0.2007	
60 minute summer	RG2	1.004	RG3	32.4	1.403	0.557	0.5493	
60 minute summer	RG3	1.005	RG4	38.4	1.470	0.661	0.5162	
60 minute summer	RG4	1.006	SW5	37.5	1.495	0.558	0.2006	
60 minute summer	SW5	1.007	SW6	37.1	1.380	0.551	0.4831	
60 minute summer	SW6	1.008	SW7	40.6	1.262	0.604	0.7351	
60 minute summer	SW7	1.009	SW8	45.5	1.224	0.782	0.2983	
60 minute summer	SW8	1.010	TANK	47.0	1.220	0.395	0.4731	
60 minute summer	RG5	6.000	TANK	5.8	1.098	0.734	0.0502	
30 minute summer	SW9	4.000	SW10	4.6	0.834	0.479	0.0533	
15 minute summer	SW10	4.001	SW12	10.4	1.477	0.976	0.1103	
15 minute summer	RG6	5.000	SW11	9.5	1.387	1.201	0.0164	
30 minute summer	SW11	5.001	SW12	9.5	2.165	0.543	0.0320	
15 minute summer	SW12	4.002	SW13	25.0	2.910	0.452	0.1287	
60 minute summer	SW13	4.003	TANK	22.4	2.397	0.379	0.1054	
60 minute summer	TANK	1.011	SW14	46.6	1.128	0.264	0.4403	
60 minute summer	P1	7.000	SW14	10.0	1.275	1.267	0.0334	
60 minute summer	SW14	1.012	SW15	42.1	0.607	0.239	0.1964	
60 minute summer	P2	8.000	SW15	4.8	1.027	0.607	0.0510	

Results for 1000 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW15	58	98.052	1.678	43.8	4.2706	0.0000	SURCHARGED
15 minute summer	SW16-OUTFALL	1	96.141	0.000	15.0	0.0000	0.0000	OK
30 minute summer	TEST TANK	23	99.109	0.509	9.6	2.8992	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	SW15	Hydro-Brake®	SW16-OUTFALL	15.0				127.4
30 minute summer	TEST TANK	3.000	SW3	-9.6	0.618	-0.413	0.0442	

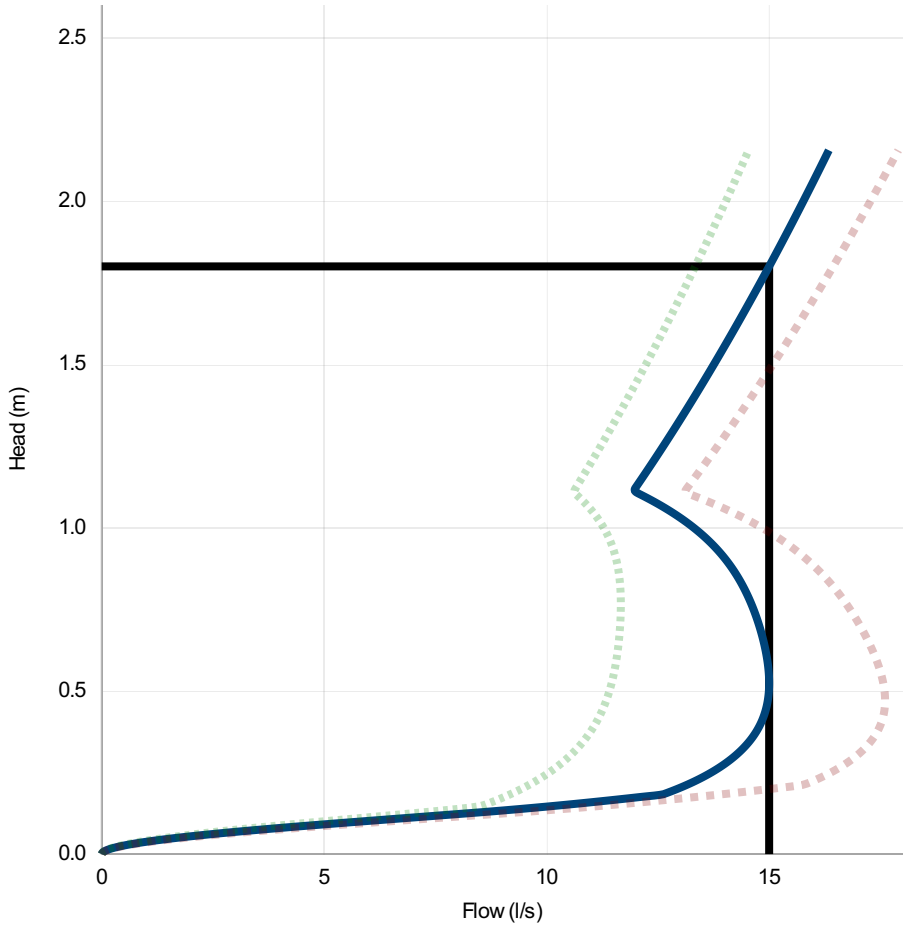
Technical Specification

	Original Setting		Minimum Setting		Maximum Setting	
Control Point	**Head (m)**	**Flow (l/s)**	**Head (m)**	**Flow (l/s)**	**Head (m)**	**Flow (l/s)**
Primary Design	1.800	15.000	1.800	13.339	1.800	16.439
Flush-Flo™	0.523	15.000	0.767	11.667	0.470	17.605
Kick-Flo®	1.111	11.940	1.107	10.590	1.108	13.080
Mean Flow		13.078		10.837		14.773

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE No 08/4596

wrc approved™
PT/503/0422
Valid: 01/04/2022 - 31/03/2027

hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.062	2.531
0.124	8.141
0.186	12.680
0.248	13.678
0.310	14.313
0.372	14.699
0.434	14.908
0.497	14.992
0.559	14.989
0.621	14.924
0.683	14.814
0.745	14.662
0.807	14.463
0.869	14.200
0.931	13.845
0.993	13.365
1.055	12.718
1.117	11.973
1.179	12.281
1.241	12.582
1.303	12.875
1.366	13.161
1.428	13.441
1.490	13.714
1.552	13.981
1.614	14.243
1.676	14.500
1.738	14.752
1.800	15.000

DESIGN ADVICE

The head/flow characteristics of this SHE-0163-1500-1800-1500 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

! **The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

Hydro International
A CRH COMPANY

DATE	26/01/2026 13:58
Site	Gowerton
DESIGNER	Joel Wall
Ref	26007

SHE-0163-1500-1800-1500

Hydro-Brake® Optimum

APPENDIX D: NRW Flood Maps

Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Risk Maps

Enter title (max 35 characters)

Legend

- Flood Defence Locations

Areas Benefitting from Flood Defences

- Rivers
- Sea
- Rivers and Sea

Flood Risk from Rivers

- High
- Medium
- Low

Flood Risk from the Sea

- High
- Medium
- Low

Flood Risk from Surface Water & Small Watercourses

- High
- Medium
- Low
- Risk Level Under Review
- Recorded Flood Extents
- Flood Storage Areas
- Flood Risk from Reservoirs

Scale at A3: 1:2,500

Date: 27/01/2026

0.1 0.05 0 0.1

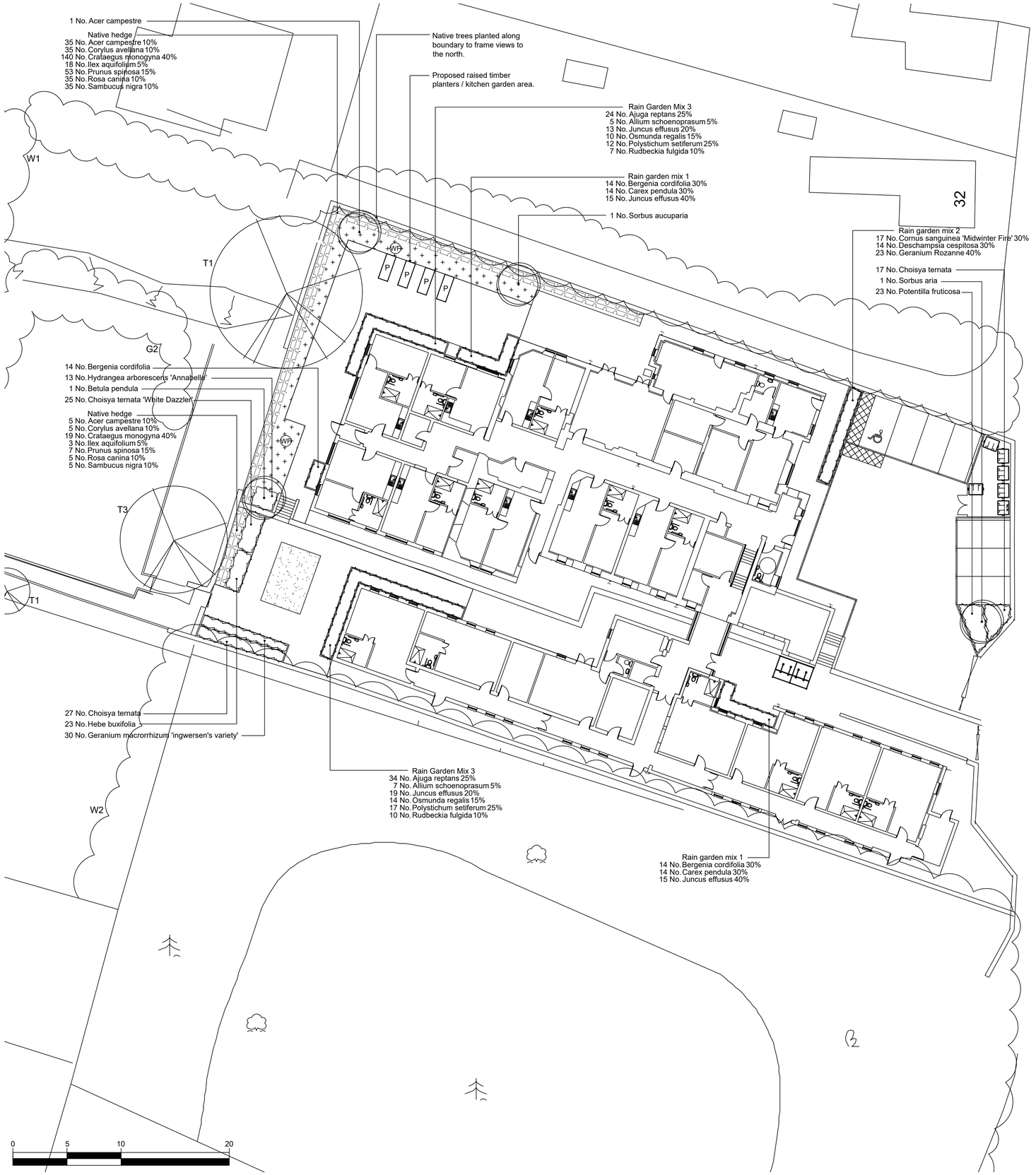
km

British National Grid

Disclaimer

https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en

APPENDIX E: Landscape Architect Plans



MOUNT STREET

PLANTING SCHEDULE

Trees

Number	Species	Girth	Specification
1	Acer campestre	14-16cm	RB Extra Heavy Standard
1	Betula pendula	14-16cm	RB Extra Heavy Standard
1	Sorbus aria	14-16cm	RB Extra Heavy Standard
1	Sorbus aucuparia	14-16cm	RB Extra Heavy Standard

Total :4

Shrubs

Number	Species	Height	Pot Size	Specification	Density
14	Bergenia cordifolia	20-30cm	3L	C	4/m²
44	Choisya ternata	40-60cm	5L	C	3/m²
25	Choisya ternata 'White Dazzler'	40-60cm	5L	C	4/m²
30	Geranium macrorrhizum 'ingwersen's variety'	30-40cm	3L	C	4/m²
23	Hebe buxifolia	30-40cm	3L	C	4/m²
13	Hydrangea arborescens 'Annabelle'	40-60cm	5L	C	3/m²
23	Potentilla fruticosa	40-60cm	3L	C	3/m²

Total :172

Native Hedge

Number	Species	Height	Specification	Percentage Contribution
40	Acer campestre	60-80cm	B	10%
40	Corylus avellana	60-80cm	B	10%
159	Crataegus monogyna	40-60cm	B	40%
21	Ilex aquifolium	40-60cm	B	5%
60	Prunus spinosa	40-60cm	B	15%
40	Rosa canina	60-80cm	B	10%
40	Sambucus nigra	60-80cm	B	10%

Total :400

Rain Garden Mix 1

Number	Species	Height	Pot Size	Specification	Density	Percentage Contribution
28	Bergenia cordifolia	20-30cm	3L	C	5/m²	30%
28	Carex pendula		3L	C	5/m²	30%
30	Juncus effusus	20-30cm	3L	C	4/m²	40%

Total :86

Rain Garden Mix 2

Number	Species	Height	Pot Size	Specification	Density	Percentage Contribution
17	Cornus sanguinea 'Midwinter Fire'	20-30cm	3L	C	5/m²	30%
14	Deschampsia cespitosa	20-30cm	3L	C	4/m²	30%
23	Geranium Rozanne	20-30cm	3L	C	5/m²	40%

Total :54

Rain Garden Mix 3

Number	Species	Height	Pot Size	Specification	Density	Percentage Contribution
58	Ajuga reptans	20-30cm	2L	C	6/m²	25%
12	Allium schoenoprasum		2L	C	6/m²	5%
32	Juncus effusus	30-40cm	3L	C	4/m²	20%
24	Osmunda regalis		3L	C	4/m²	15%
29	Polystichum setiferum		3L	C	3/m²	25%
17	Rudbeckia fulgida		3L	C	4/m²	10%

Total :172

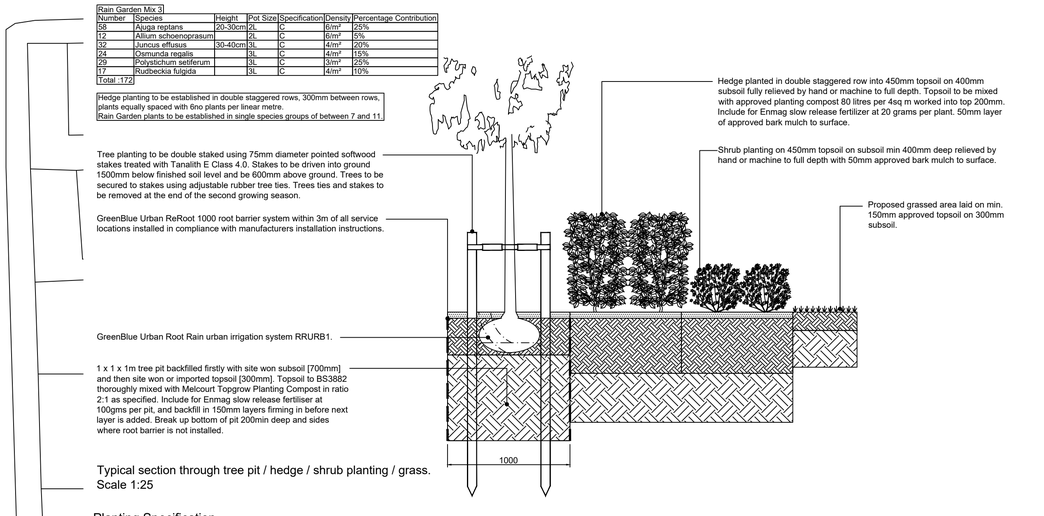
Hedge planting to be established in double staggered rows, 300mm between rows, plants equally spaced with 6no plants per linear metre.
Rain Garden plants to be established in single species groups of between 7 and 11.

LEGEND

- Existing surveyed trees to be retained and protected in accordance with BS 5837:2012 as required and in accordance with the Arboricultural Report.
- Existing trees to be removed as part of the development.
- Existing groups of trees / vegetation / hedges to be retained and protected in accordance with BS 5837:2012.
- Existing groups of trees / vegetation / hedges to be removed as part of the development.
- Proposed tree planting. Refer to schedule for details.
- Proposed hedge planting. Refer to schedule for details.
- Proposed shrub planting to include pollinators. Refer to schedule for details.
- Proposed grassed areas to be turfed as required using Rolawn Medallion or similar on min.150mm topsoil on min. 300mm subsoil as per specification.
- Proposed wildflower seed mix to be Germinal Mix 'WFG18 Butterfly & Honeybee' sown at the recommended rate of 5g/m2. To be left uncut and strimmed only twice per year.

Notes about birds breeding season and tree removal:
It is recommended that vegetation which needs to be removed is done prior to the bird breeding season. [1st March to 31st August]. If this is not possible within this period, the vegetation removal should be carried out under the supervision of an Ecologist.

If birds are found to be breeding in the vegetation which needs to be removed then vegetation removal in the area surrounding the nest must be delayed until the eggs have hatched and the young birds have left the nest.



Typical section through tree pit / hedge / shrub planting / grass.
Scale 1:25

Planting Specification

All work and materials shall be in accordance with current British Standards components and to Code of Practice.

SITE CLEARANCE

a - Remove general builders rubble, litter and any stones greater than 75mm in size from the areas to be planted. Such materials are to be collected and taken to the Contractors tip or disposed of on site as directed.

EARTHWORKS
Planting Areas

a - Approved topsoil, both site won and imported, shall be led onto site and spread evenly on the approved formation to give a finished depth of 150mm for grassed areas, 450mm for shrub planted areas and 1000mm depth for tree pits. All topsoil to be placed on a minimum of 300mm depth of subsoil.
b - Finished levels of topsoil in grassed areas to be 25mm above adjoining paving. Finished level of topsoil in shrub beds to be 50mm lower than adjacent edge to allow placing of bark mulch.
c - Supply and spread approved fertiliser such as SAI Enmag or similar standard at the rate of 70g/m to be worked into top 200mm.

CULTIVATIONS AND PLANTING
Planting Areas

a - Shrub beds shall be cultivated prior to planting to produce a medium tilth and all weeds, stones and other debris arising from this work are to be collected and removed from site.
b - Spread approved tree and shrub planting compost over the planting beds at a rate of 20 litres/m² and work into the top 200mm.
c - Shrubs to be sited in locations, numbers and densities shown in the planting schedule and on the soft landscape drawings. Shrubs to be placed to achieve an even spacing and matching of shapes. All shrubs are to be planted at the depth at which they have previously been growing, allowing for soil settlement after planting.
d - Surfaces of shrub planting areas shall be left clean and neat with a raked surface between the planting during and on completion of planting.
e - Immediately after planting all containerised plants shall be watered with 5 litres of water per plant.
f - All grass edges to be cut vertically with an edging iron to a depth of 100mm. Resultant edges to be clean and straight or an even smooth radius. Edges to be left neat and tidy with ground on shrub side meeting cut face at an even gradient. All cuttings to be removed from site.
g - A 50mm layer of matured conifer bark to be spread over planting areas and tops of tree pits, at least 75% of which shall exceed 60mm particle size and shall contain a minimum of wood particles, the bark is to be pest, disease and weed free.

Tree Planting - Planting Pits

a - Excavate tree pits as follows:-
Standard / Feathered trees -1000 x 1000 x 1000mm
Semi-Mature trees - 1500 x 1500 x 1000
b - Loosen base to a further depth of 200mm and scarify sides. Dispose of unsuitable excavated material off site to approved tip.
c - Trees to be double staked with stakes positioned parallel to the adjacent kerb line or paving. Tree stakes to be pressure treated, minimum diameter 65mm and pointed at one end. Stakes to be driven into the pit before planting to a minimum depth of 300mm below the base of the pit:-
d - Trees to be planted in pit to a depth and orientation related to the original growing position in the nursery and backfilled with the excavated topsoil mixed with approved tree and shrub planting compost in the following amounts:-
Feathered trees - 60 litres/tree
Standard trees - 95 litres/tree
Heavy standard trees - 120 litres/tree
Semi-mature trees - 150 litres/tree
e - Trees to be tied to the supporting stakes with adjustable reinforced rubber tree ties with solid rubber spacers, positioned at an approved point suitable to the habit of the tree.
f - Proposed trees within 3m distance from buildings or services, or within 2.5m of roads/parking areas are to have root barriers installed.
g - Water to be applied to all trees and transplants on the same day as planting:-
Feathered trees - 36 litres/tree
Standard trees - 36 litres/tree
Heavy Standard trees - 42 litres/tree
Extra Heavy standard - 48 litres/tree

Grass Seeding

a - Areas for seeding to have topsoil depths of min. 150mm apart from wildflower areas where seed should be sown directly onto subsoil.
b - One month prior to sowing, areas shall be harrowed to a depth of 100mm followed by chain harrowing to a depth of 50mm to produce a fine tilth. Finished surfaces to be rolled with a Cambridge roller.
c - All weeds, stones and other debris arising from this work shall be collected and removed from site to the Contractors tip.
d - All grassed and broad-leaved plants which emerge between cultivations and seeding shall only be treated with an approved translocated herbicide before sowing.

Minor Grading

a - Finished levels of amenity grass areas to be 25mm above adjoining paving or kerbs. Levels to be arranged to give gentle falls for drainage purposes.
b - New areas to be married in to adjoining soiled areas.

Final Cultivations

a - The surface for seeding should be 25mm deep and free from weeds and stones.

Sowing
Grass Seed Mixes

a - Germinal Seeds Ref: 'A22 Low Maintenance' sown at recommended rate of 50g/m², or similar approved.
b - Germinal Seeds Ref: 'WFG18 Butterfly and Honeybee' sown at recommended rate of 5g/m², or similar approved.

Procedure

a - The Contractor shall purchase fresh grass seed each season throughout the contract period. The grass seed shall be made up of certified seeds under EEC regulations. The seed shall have a certified germination of not less than 10% and a certificate of purity of not less than 90%. Total weed seed and other crop seeds content shall not be more than 15. Seeds shall be obtained at least 21 days before sowing.
b - The Contractor shall be required to submit certificates for all deliveries of grass seed stating the seed source, mixture percentage, percentage purity and germination period. All seed shall be delivered in original sealed bags.
c - Amenity grass seed mixes are to be sown onto a minimum of 150mm depth of topsoil on min. 300mm subsoil.
d - After sowing, all amenity grass areas are to be consolidated using an approved type ringed roller.
e - Sowing shall be carried out in suitable weather conditions in transverse directions. After sowing, ground to be lightly raked and all stones over 12mm gauge shall be removed.

Turfed Areas

a - Ensure soil below is prepared correctly, level and lightly watered before laying the turf. Each row of turf should be laid so that joints are offset by min 300mm. Start laying along a straight side in a row butt jointing the ends tightly together.
b - Do not stretch the turf, always push the turf into a joint. Avoid gaps, but if they do occur fill them in with a light soil/sand mixture. Ensure complete contact between the soil and the underside of the turf and if necessary use a flat board or head of a rake to lightly firm down the turf.
c - Immediately after laying, start watering. Ensure that the new turf is never short of water. Water repeatedly for at least two weeks and/or until the turf is well established. Once established, weekly watering during dry periods should be adequate. First cut to be undertaken once grass sward is long enough to cut.

Grass Subsidence/Damage

a - Any subsidence of seeded or turfed areas below the specified levels shall be made good and re-seeded. These works shall be rectified a the Contractor's expense.
b - The Contractor shall make good any damage caused by work personnel, plant or material whilst carrying out and maintaining the work on site

Watering

a - Contractor shall be entirely responsible for all watering necessitated by dry weather and it shall be undertaken by stationary rotary sprays.

Completion

a - Grass areas shall be accepted as having reached practical completion only when germination has proved satisfactory and healthy weed free swards have been established.

MAINTENANCE

General

a - The Contractor shall be responsible for the maintenance of the planting and grassed areas for a 12 month period following the completion of the works and will be responsible for any defects due to faulty materials, including plant failures, or workmanship during this time.
b - The Contractor shall carry out maintenance work at suitable intervals and in suitable weather conditions.
c - 48 hours notice in writing shall be given before commencement of any maintenance operations. Failure to do so will result in non payment for any supposed work carried out.

Defects Liability Period

a - Any trees, shrubs and grass found to be defective or missing for any reason before practical completion shall be replaced by the Contractor entirely at his own expense.
b - Thereafter any failures within 12 months of the date of practical completion shall also be replaced to the original specification by the Contractor entirely at his own expense, in the next planting season.
c - Thereafter any failures within the next 4 years shall also be replaced to the original specification in accordance with the planning conditions.

Weed Control

a - Keep shrub beds and areas around trees free from annual and perennial weeds by hand weeding. All arisings to be removed from site. Allow 7 no. visits per year.
b - Apply translocated herbicide to shrub beds using weed wiper. Allow 3 visits a year with dead weed growth removed after each visit.

Mulch

a - Bark mulch to be reinstated to original depths at the end of each growing season. Allow 1 no. visit per year.

Watering

a - All planting shall be watered with a low pressure hose during dry spells, within the first year of growth only, at the following rates:-

Feathered/standard trees	-	36 litres/tree/visit
Heavy standard trees	-	42 litres/tree/visit
Semi-mature trees	-	48 litres/tree/visit
Shrubs	-	5 litres/plant/visit

Fertiliser

a - At the end of the establishment period, 30gms of slow release fertiliser to be applied around each plant. Allow 1 no. visit at end of Year 2

Grass Cutting

a - Areas sown with amenity mix:
16no. visits between April and October. Grass areas to be cut to a height of c.40mm. NB: in drought conditions adjust cutting heights to c.60mm. In very wet conditions, all operations involving grass cutting shall cease until conditions allow operations to continue without damaging the surfacing, levels and contours of the ground. Allow for sweeping clean of all paths and roads of grass cuttings at each mowing
c. IN ALL CASES all arisings are to be removed from site.

Firming In

a - All plants and tree stakes loosened by planting operations, wind or frost shall be firmed in. Allow 1 no. visit per year.

Litter Collection

a - Whole site to be kept in a clean and tidy condition throughout the establishment period. Litter to be removed from site. Allow 20 no. visits per year.

REV.	DESCRIPTION.	DATE.
-	-	-

REV.	DESCRIPTION.	DATE.

REV.	DESCRIPTION.	DATE.

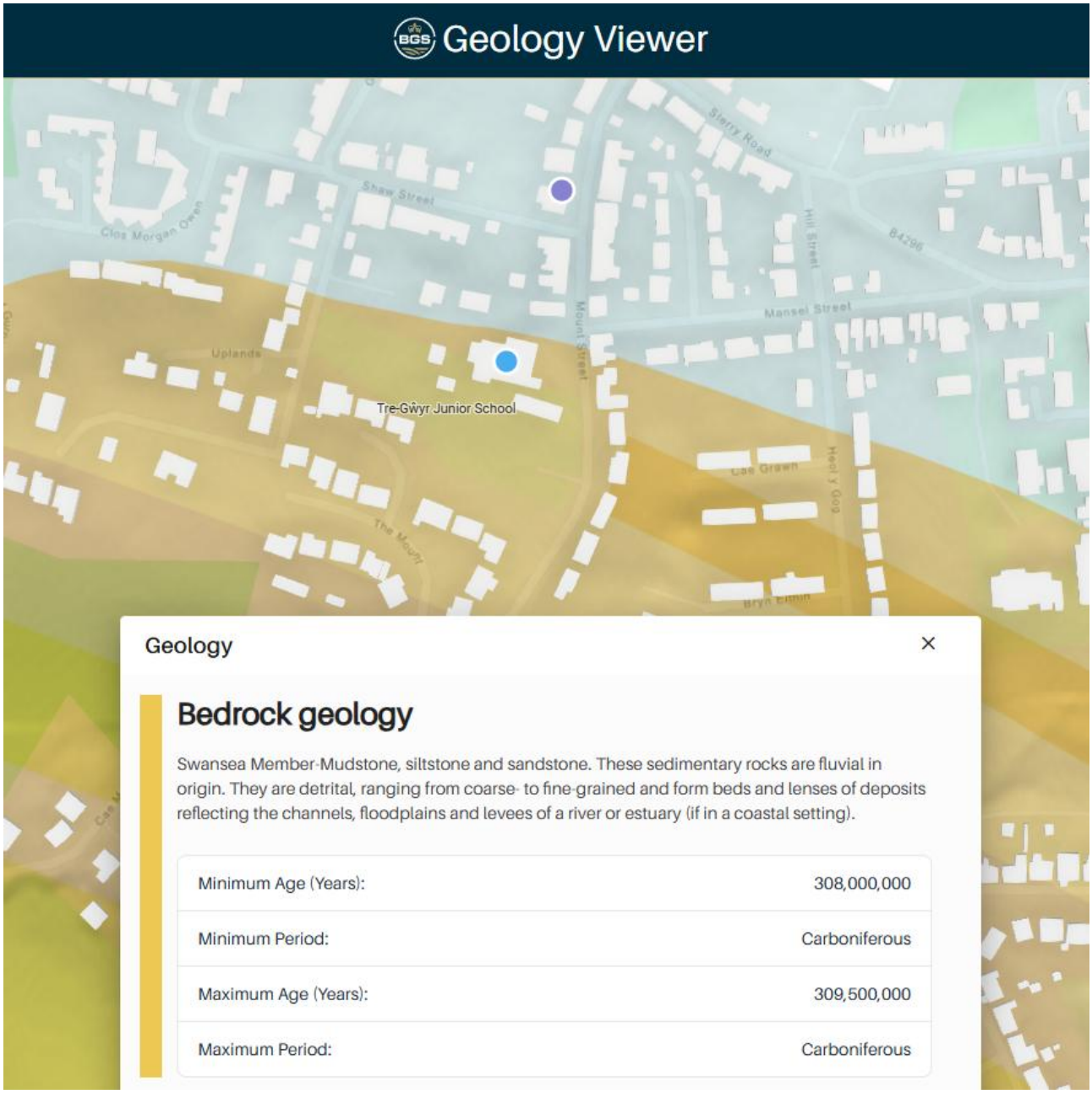
IMPORTANT CDM / H&S NOTE
The designers would draw the readers attention to key residual construction health and safety hazards that have not been eliminated from the designs shown on the drawings by the design process. These hazards are identified below:
Working on or adjacent to the public highway.
Working adjacent to water bodies during storm conditions.
Working adjacent to changes in level.
Any construction personnel including operatives intending to construct the designs shown on this drawing should ensure that they have been thoroughly briefed by the principle contractor on all health and safety matters and have sight of:
1. The full designers and contractors hazard risk assessments and risk registers.
2. The developed construction phase health and safety plan.
3. The contractors construction method statements.

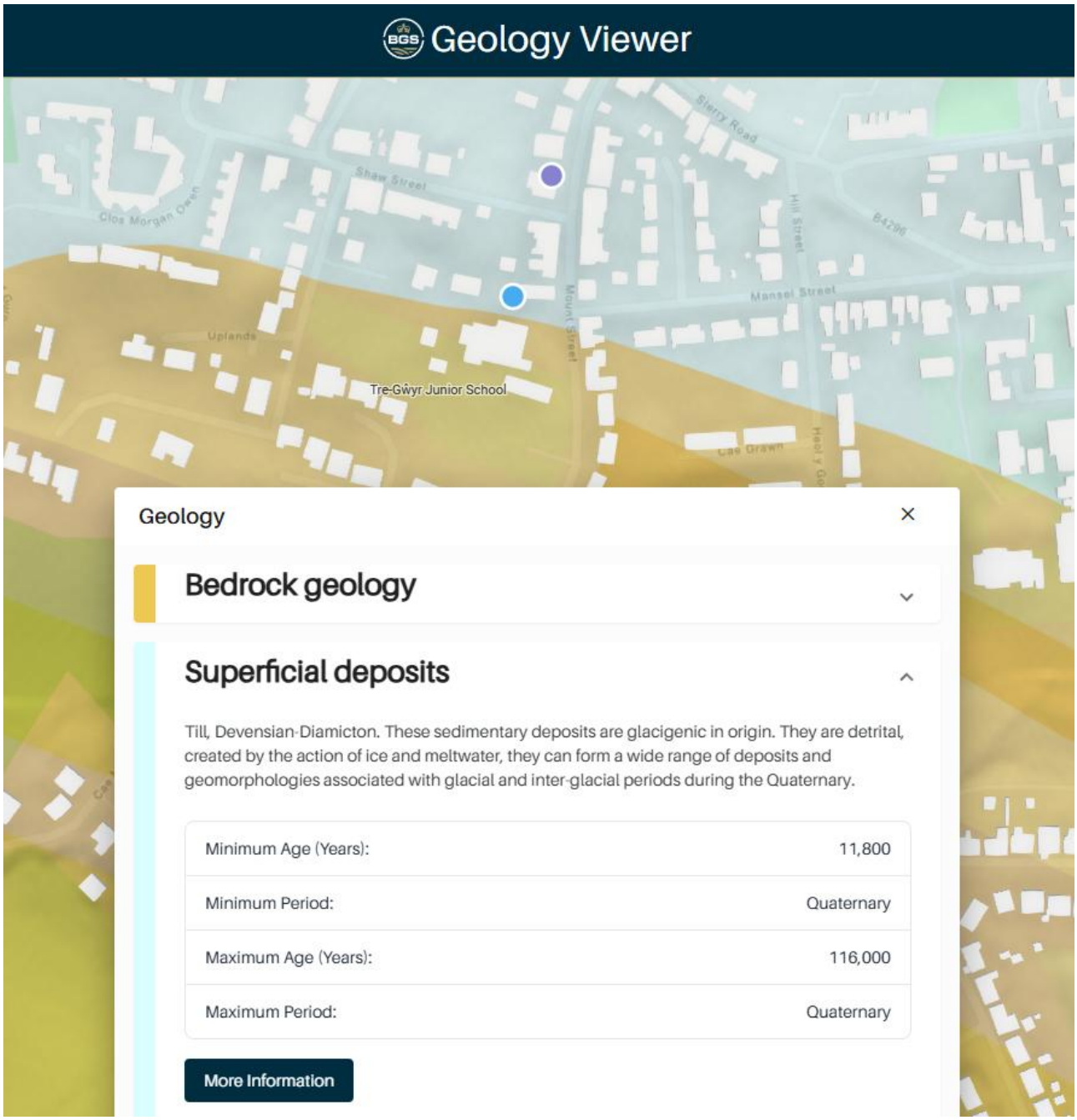
dp landscape architecture
Newcastle Upon Tyne
T: 0191 597 1724
Cardiff / Caerdydd
T: 01446 773 861
info@dpla.co.uk
www.dplandscapearchitecture.co.uk

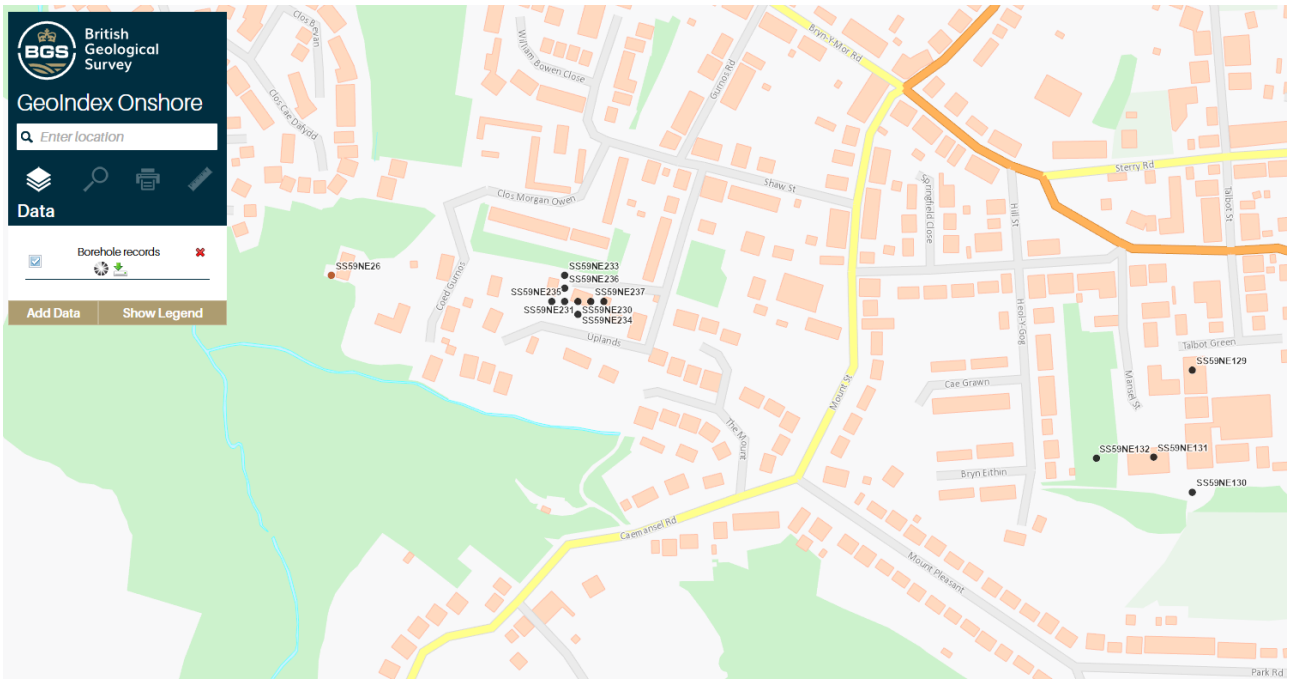
PROJECT
Former Gowerton Primary School, Swansea
DRAWING TITLE
Soft Landscape Proposals

DRAWING No.	SCALE (A1)	DATE	DRAWN	CHKD
1271.01	1:200	Jan/26	LH	DP

APPENDIX F: British Geological Survey Maps




Geology Viewer
Sherry Road
Shaw Street
Clos Morgan Owen
Hill Street
B4298
Mansel Street
Mount Street
Uplands
Tre-Gwyr Junior School
Cae Draw
Geology
Bedrock geology
Superficial deposits
Till, Devensian-Diamicton. These sedimentary deposits are glacigenic in origin. They are detrital, created by the action of ice and meltwater, they can form a wide range of deposits and geomorphologies associated with glacial and inter-glacial periods during the Quaternary.
Minimum Age (Years): 11,800
Minimum Period: Quaternary
Maximum Age (Years): 116,000
Maximum Period: Quaternary
More Information


British Geological Survey
GeoIndex Onshore
Enter location
Data
Borehole records
Add Data
Show Legend
SS59NE26
SS59NE233
SS59NE236
SS59NE235
SS59NE237
SS59NE231
SS59NE230
SS59NE234
SS59NE129
SS59NE132
SS59NE131
SS59NE130
Bryn Y Mor Rd
Shaw St
Sterry Rd
Springfield Close
Hill St
Talbot St
Talbot Green
Uplands
Cae Grawn
Bryn Eithin
Caemanscel Rd
Mount Pleasant
Park Rd