Contents

1. Scope of Works / Description of Systems of Plant & Equipment

1) Scope of Works

- Sapoflow have designed, supplied & installed the Sapoflow Siphonic roof drainage systems within the building.

2) General System Description

- The Sapoflow System is separately designed as an integral part of the rainwater removal system for a building. As such, the design of the Sapoflow System should be considered, in relation to the overall building design, only as a component part of the overall design of the roof rainwater removal system.

- The siphonic system comprises of the following:

    - Siphonic Rainwater outlets - water inlet point located at roof level (within gutter or on flat roof).
    - Tailpipes - connecting rainwater outlets to horizontal collection pipes.
    - Horizontal collection pipes located at high level.
    - Downpipes ultimately connected into main ground drain, the bottom of the downpipes being the water exit point and the lower extremity of the System.

- The rainwater outlets are free issue to the Main Contractor/Roof Contractor /Gutter Manufacturer for them to install prior to Sapoflow attending site. The responsibility for a watertight seal lies with the installer. Where the roof/gutters are membrane lined, membrane patches will be supplied to Sapoflow for fixing into the outlets prior to their free issue to the recipient. Sapoflow will issue the outlets so the inlet orifice is sealed with membrane and should remain so until the system installation is complete. The Roof Contractor /Gutter Manufacturer will cut accommodation holes at intervals in the Roof/Gutter to accept the rainwater outlets, and will attach the rainwater outlets to the Roof, Roof Membrane/Gutter and create a suitable seal to ensure that the joint is waterproof.

- Sapoflow will specify hole sizes and spacing intervals to the Main Contractor/Roof Contractor/Gutter Manufacturer, and no deviation from these specifications can be made without the prior approval of Sapoflow.

- The pipes are suitably supported along the horizontal runs and vertical downpipes and the fixing methods are developed to cater for expansion and contraction. The downpipe connection into main ground drain is made at either ground level or at the first local manhole and is the responsibility of the main contractor unless otherwise agreed with Sapoflow. All above ground site installed pipe joints are secured by use of electro-fusion sleeves.

- Roof, gutter and below ground surface water drainage downstream of the Siphonic discharge point do not form part of the System as designed by Sapoflow, and the design of these elements does not form any part of the design of the System, and no liability will be accepted by Sapoflow in respect of the design of these elements which are the subject of expertise not claimed by Sapoflow.

- In considering the design of the System certain elements of roof design are taken into account - essentially area and pitch/fall - necessary for the calculation of volumes of water for removal.

2. Suppliers and Manufacturers Directory

SAPOFLOW

Sapoflow uv-system® Siphonic Roof Drainage

SAPOFLOW LIMITED
FALL BANK INDUSTRIAL ESTATE
DODWORTH BARNSLEY
SOUTH YORKSHIRE S75 3LS

TELEPHONE 01226 **297200**
FACSIMILE 01226 **204038**
e-mail:**info@sapoflow.com**
http://www.sapoflow.com

Siphonic Drainage

Project Details:

Project Name	Panattoni, Horton Road, Poyle
Sapoflow Project Reference	23207
Main Contractor	Winvic Construction Ltd

Sub-Contractor Details:

Sub-contractor Name	Sapoflow Limited
Sub-contractor Address:	Fall Bank Industrial Estate Dodworth Barnsley S75 3LS
Sub-Contractor Telephone	01226 297200
Sub-Contractor Email	info@sapoflow.com
Sub-Contractor Website	www.sapoflow.com

3) Supplier Directory

Item	Supplier	Supplier Address
Siphonic Outlets	Sommerhein	Sommerhein AB Fabriksgatan 7 412 50 Gothenburg Sweden
HDPE Pipework	Radius	Radius Systems Ltd Berristow Lane South Normanton Derbyshire DE55 2JJ
HDPE Fittings	Ebero	Stubley Works, Wreakes Lane, Dronfield S18 1PN
Metalwork	SIG Fixings	SIG Fixings Unit E 10 Kingsmark Freeway Bradford BD12 7HW

3. Manufacturers Information

Sommerhein AB
Fabriksgatan 7
412 50 Gothenburg
Sweden

Tel: 00 46 8 765 39 29
e-mail: info@uv-system.com
website: www.uv-system.com

Agrément Certificate
07/4438
Product Sheet 1

UV-SYSTEM

SIPHONIC ROOF DRAINAGE SYSTEM

This Agrément Certificate Product Sheet(1) relates to the UV-System Siphonic Roof Drainage System, for use on all building types. The system comprises full bore flow components and the UV-System design software. The components are for use with conventional pressure-rated pipe systems.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

System design and dimensioning — the UV-System design software allows the system to be designed to deal with anticipated rainfall. A trained system designer is responsible for this work (see section 6).

Flow characteristics — the performance of the outlets running at normal and peak rainfall intensities has been assessed (see section 7).

Strength — the outlets have sufficient strength to resist the loads that may reasonably be expected to occur during installation and service (see section 9).

Durability — under normal service conditions, the outlets will have a service life comparable to, or in excess of, the gutter into which they are installed (see section 16).

The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 16 March 2018

Originally certificated on 4 October 2007

Paul Valentine
Technical Excellence Director

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body – Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

22 Conditions

22.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

22.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

22.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

22.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

22.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

22.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

Regulations

In the opinion of the BBA, the UV-System Siphonic Roof Drainage System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

The Building Regulations 2010 (England and Wales) (as amended)

Requirement: **C2(b)** **Resistance to moisture**
Comment: The joints between the roof outlet and the roof will adequately resist the passage of moisture to the inside of the building. See section 8.2 of this Certificate.

Requirement: **H3(1)** **Rainwater drainage**
Comment: The roof outlets will contribute to carrying the flow of rainwater from the roof to an outfall, thus minimising the risk of blockage or leakage. See sections 8.1 and 12 of this Certificate.

Regulation: **7** **Materials and workmanship**
Comment: The system is acceptable. See section 16 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation: **8(1)(2)** **Fitness and durability of materials and workmanship**
Comment: The system can contribute to a construction satisfying this Regulation. See sections 15 and 16 and the *Installation* part of this Certificate.

Regulation: **9** **Building standards applicable to construction**
Standard: 3.6(a) Surface water drainage
Comment: The roof outlets will contribute to carrying the flow of rainwater from the roof to an outfall, thus minimising the risk of blockage or leakage and, therefore, satisfying the requirements of this Standard, with reference to clause 3.6.1[(1)(2)]. See sections 8.1 and 12 of this Certificate.

Standard: 3.10 Precipitation
Comment: The joints between the roof outlet and the roof will adequately resist the passage of moisture to the inside of the building and, therefore, the system satisfies the relevant requirements of this Standard, with reference to clause 3.10.7[(1)(2)]. See section 8.2 of this Certificate.

Standard: 7.1(a)(b) Statement of sustainability
Comment: The system can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation: **23** **Fitness of materials and workmanship**
Comment: The system is acceptable. See section 16 and the *Installation* part of this Certificate.

Regulation: **28** **Resistance to moisture and weather**
Comment: The system satisfies the relevant requirements of this Regulation. See section 8.2 of this Certificate.

Regulation:	**82**	**Rain-water drainage**
Comment:		The system satisfies the relevant requirements of this Regulation. See sections 8.1 and 12 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.2) and 18 *General* (18.4) of this Certificate.

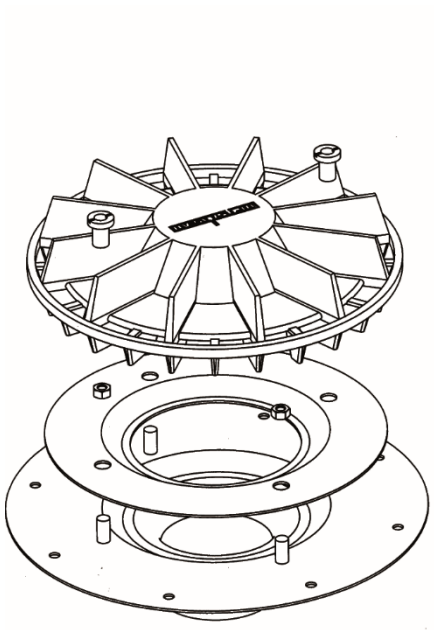
Technical Specification

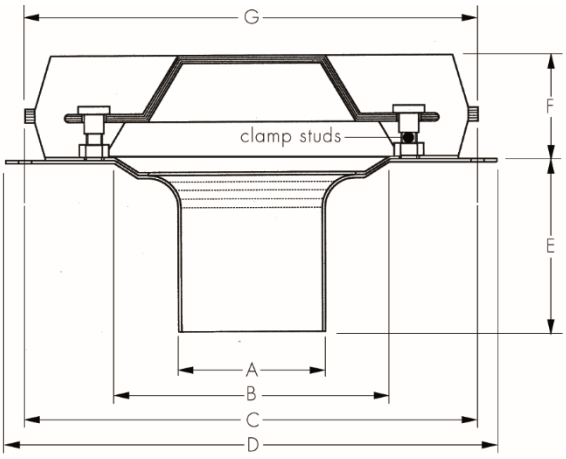
Description

1.1 The UV-System Siphonic Roof Drainage System consists of roof outlet (drains, models UV57, UV72, UV107 and UV122), technical specifications and computer software to design the pipework specified for each installation.

1.2 The roof outlets (drains) are available in stainless steel in sizes DN50, DN75, DN100 and DN125). UV57 and UV72 outlet models are also available with BSP (British Standard Pipe) threaded spigots. The system components are shown in Figures 1 and 2.

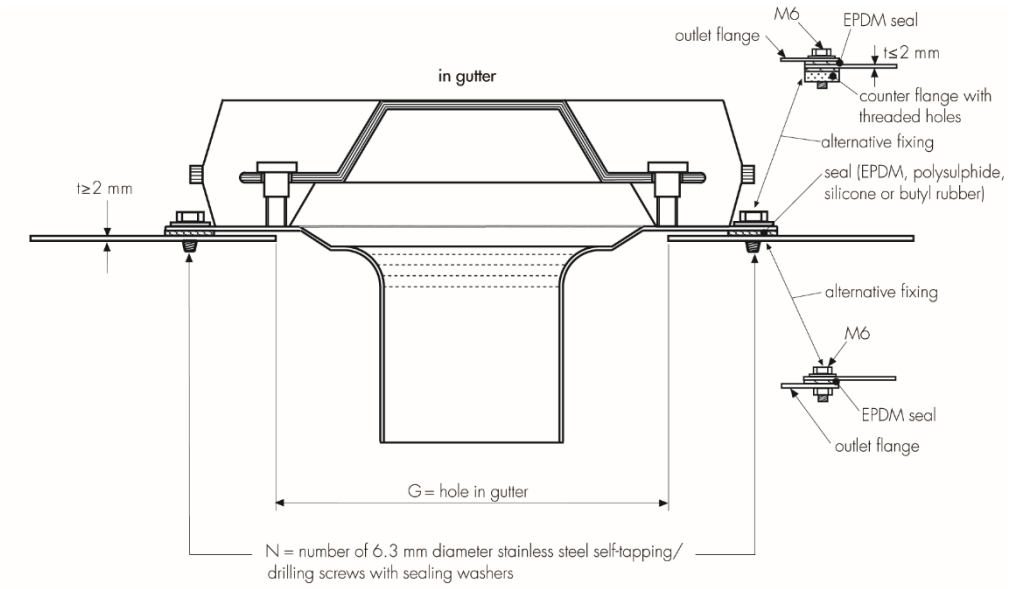
Figure 1 Roof outlet — exploded and cross-section views (dimensions in mm unless noted otherwise)





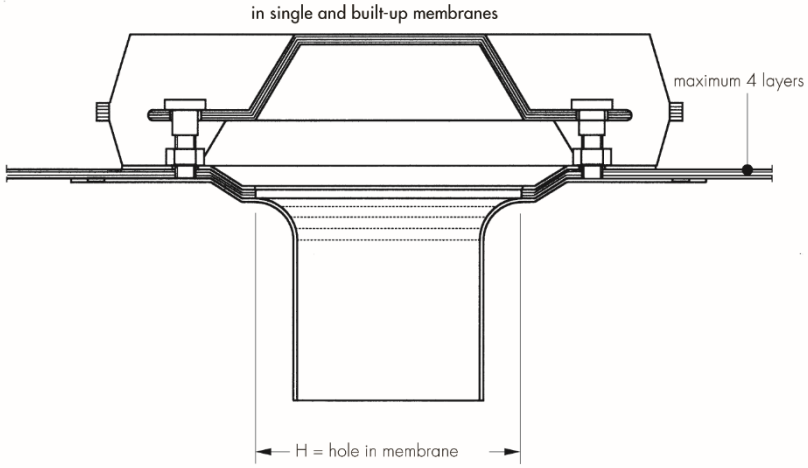
Outlet model	A	B	C	D	E	F	G
UV57	DN50 or 2" BSP	120	180	200	min 53	48	182
UV72	DN75 or 2.5" BSP	140	230	250	min 59	53	230
UV107	DN100	240	355	390	min 75	103	352
UV122	DN125	240	355	390	min 75	103	400

Figure 2 Roof outlets (all dimensions in mm)

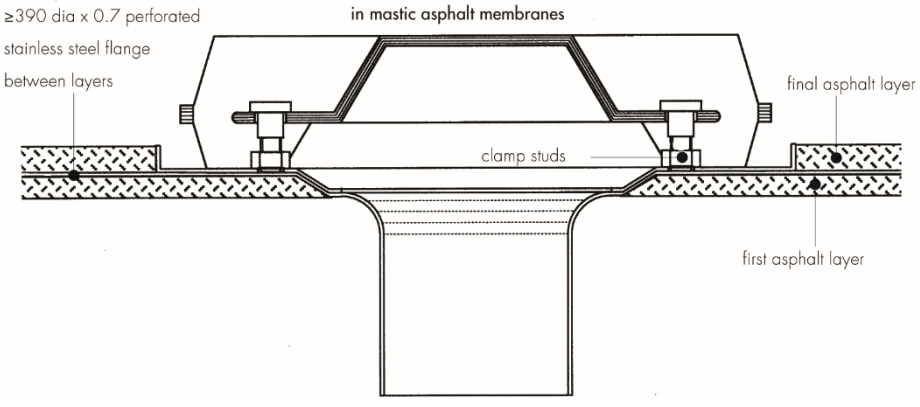


Outlet model	G	N
UV57	min 120, max 160	8
UV72	min 140, max 210	8
UV107	min 240, max 330	12
UV122	min 240, max 330	12

Installing the outlet by welding is an alternative solution provided the gutter sole is made of a material compatible with the outlet



Outlet model	H
UV57	82
UV72	102
UV107	160
UV122	160



1.3 Stainless steel orifice plates from 57 to 122 mm in diameter with holes from 15 to 110 mm in diameter are available to vary the hydraulic resistance of the roof outlet.

1.4 The roof outlets are for use with the pipes and fittings covered by the performance specification given in section 4. Pipework should be independently certificated for compliance with the declared specification.

1.5 Suitable pipes and fittings are available in the following materials, however these are outside the scope of this Certificate:

- cast iron
- stainless steel
- galvanized steel
- copper
- PVC-U
- PE
- ABS
- PP
- thermoplastic coated steel
- ductile iron.

2 Manufacture

2.1 The roof outlets (drains) are manufactured from stainless steel with strainers with integrated air baffles made of aluminium alloy.

2.2 Factory production control is exercised during manufacture including checks for conformity to the specification of the raw materials, and checks on dimensions, thickness and visual appearance. Weld integrity of the studs and airtightness checks on the outlet (drain) body are carried out on each unit.

2.3 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.4 The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by SFK (Certificate 1896).

3 Delivery and site handling

3.1 Each outlet carries the product code, the Certificate holder's logo and the BBA logo. The BBA logo incorporating the number of this Certificate is included in the Certificate holder's technical literature. The products are delivered to site either on pallets or in single boxes depending on the quantity.

3.2 Care should be taken when handling the products, to avoid damage and ensure the safety of site operatives.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the UV-System Siphonic Roof Drainage System.

Design Considerations

4 Use

4.1 When designed, installed and used in accordance with the provisions of this Certificate, the UV-System Siphonic Roof Drainage System will convey rainwater from the roof to a below-ground drainage system outside the building.

4.2 Further advice on designing full bore flow roof drainage systems is given in the *UV-System Technical Manual* and BS 8490 : 2007.

4.3 Gutters should be designed in accordance with BS EN 12056-3 : 2000. In case of deviation in calculated water depths between BS EN 12056-3 : 2000 and the *UV-System Technical Manual*, the most conservative value should be used.

4.4 Pipes and fittings must satisfy the performance specification fully detailed in the *UV-System Technical Manual*. The key performance characteristics include:

- pipework must withstand both negative and positive pressure; negative pressures to -90 $kN \cdot m^{-2}$ and positive pressures according to the design specification, which must not exceed the rating of the pipe
- joints must be capable of either resisting longitudinal forces without sliding apart or must be restrained to prevent relative movement
- bends deviating by more than 45° from straight flow should be of a smooth radius
- eccentric reducers are recommended for use in horizontal flows with the crown of the pipe level.

4.5 When the capacity of the underground drainage system is not sufficient to cope with the design flow rate of the UV-System, the system must be suitably ventilated to prevent the downstream head on the UV-System exceeding ground level. Where appropriate, the guidance given in BS 8490 : 2007, Clause 8.10.1, should be followed to ensure surcharging of the underground drainage system does not reduce the capacity of the roof drainage. If the underground system is part of the UV-System, other connections must not be made upstream of the UV-System discharge.

5 Practicability of installation

The system is designed to be installed by a competent general builder, or a licensed contractor familiar with this type of system.

6 System design and dimensioning

6.1 Each system must be designed by a person trained to use UV-System computer software and familiar with hydraulic and roof drainage design procedures.

6.2 The system is designed to flow at maximum capacity when rainfall is at the design intensity. A system using the pipe dimensions obtained from the design will ensure sufficient capacity to transport the water from the roof to the discharge point.

6.3 Information required to enable a design to be carried out includes:

- design rainfall intensity (normally selected or calculated from BS EN 12056-3 : 2000 or other appropriate guidance documents)(1)
- geometric layout of the roof and outlets including the height of the building and its location and plan location
- position of underground connection.

(1) The Certificate holder can establish the design rainfall intensity required for the building location, category of risk and estimated building life, but this aspect is outside the scope of this Certificate.

6.4 Use of the UV-System computer software ensures that the most economic and effective design is achieved. Critical conditions to be achieved in any design include:

(a) minimum water velocity must be 0.7 $m \cdot s^{-1}$ at the design flow to prevent build-up of sediment or other debris in the pipes
(b) computed flow(1) from an individual outlet must not exceed the specified maximum for each outlet size
(c) in systems with more than one roof outlet, the imbalance in the system should not exceed 0.5 m
(d) negative pressures in the pipework must be controlled to prevent cavitation
(e) the time for the system to prime should not exceed 60 seconds unless rainwater can safely be temporarily retained on the roof during the design storm.

(1) The computation of the ultimate capacity under full-bore flow has been verified by testing.

6.5 The designer may vary the pipework sizing, layout, or flow to each outlet, or incorporate orifice plates to achieve an acceptable installation.

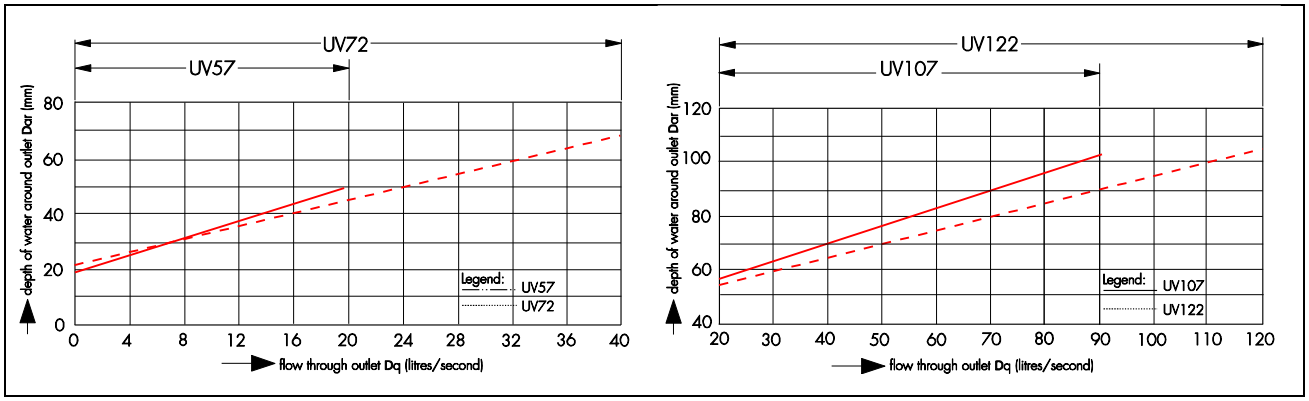
6.6 An approximate indication of the pipe sizes required can be made using a manual dimensioning procedure detailed in the *UV-System Technical Manual*.

6.7 The maximum permitted flow through an outlet is 20, 40, 90 and 120 litres per second for UV57, UV72, UV107 and UV122 outlets respectively.

7 Flow characteristics

When the system is operating at the design rainfall intensity, the high velocity of the water will ensure the system is self-cleansing. Self-cleansing can also occur at rainfalls as low as 25% of the design intensity. At rainfalls less than this, the system will operate under vented gravity flow conditions. The outlets satisfy the minimum flow rates for roof outlets for siphonic drainage systems as defined in BS EN 1253-2 : 2015. The flow characteristics of the outlets are shown in Figure 3.

Figure 3 Flow against depth of water at the outlet (at full bore flow)



8 Performance of joints

8.1 The performance of the joint to the pipework system is dependent on the pipework system adopted. Conventional jointing techniques using independently approved products should provide satisfactory performance (see section 1.4).

8.2 The performance of the joint between the outlet and the roof material is dependent on the installation. Conventional jointing techniques for roofs constructed of similar materials applied correctly should give satisfactory performance.

9 Strength

The roof outlets have adequate strength to resist loads associated with installation and subsequent use. The standard gratings comply with BS EN 1253-2 : 2015, Class H1.5, and the flat-topped UV72 grating complies with BS EN 1253-2 : 2015, Class K3.

10 Roof/gutter design

10.1 The roof must be designed to allow rainwater to flow freely to the outlets.

10.2 The water depth around the outlet when the system is operating at its maximum flow rate (full-bore flow) may be estimated from Figure 3.

10.3 The maximum water depth on the roof or in the gutter must be estimated in accordance with BS EN 12056-3 : 2000. Where calculated water depths differ between the *UV-System Technical Manual* and BS EN 12056-3 : 2000, the most conservative values should be used.

10.4 The water loading on the roof gutter, caused by the water depth, must not exceed the allowable roof or gutter loading.

10.5 It is recommended that in accordance with BS EN 12056-3 : 2000, the roof and/or gutter design incorporates a built-in overflow facility. The roof must be designed to hold water up to this level should the design rainfall be exceeded or unexpected blockages occur.

11 Resistance to chemicals

The performance of the roof outlets will be unaffected by the types and quantities of chemicals associated with rainwater.

12 Resistance to blockage

The high velocities at which the water flows through the pipework, together with the design of the roof outlets, reduce the risk of blockages [see also sections 6.4(a), 10 and 15].

13 Behaviour in relation to fire

The bodies of the roof outlets are stainless steel and will not affect the overall fire resistance of the roof in which they are installed.

14 Thermal insulation

Outlets can be supplied with moulded, foamed polyethylene insulation (not covered by this Certificate) fitted to the underside. It may be desirable in some situations to provide additional insulation and to insulate the pipework to prevent condensation. This will depend on the relative humidity and the temperature. It is the responsibility of the building designer to ensure the positioning of the outlets and pipework does not compromise the integrity of the insulation of the buildings and that relevant building regulations are complied with.

15 Maintenance

Periodic inspection in accordance with BS EN 12056-3 : 2000, Clause NE 5.1, should be carried out to ensure that the outlets are free from gravel, leaves and other debris which could impair the performance of the system. Maintenance is the responsibility of the building owner.

16 Durability

The materials used for the manufacture of the outlets are highly durable and when installed correctly will have an effective life equivalent to, or in excess of, the roof or gutter in which they are installed.

17 Recyclability

The stainless steel components of the system (outlet body/clamping ring/orifice plates, fixings) and aluminium components (strainer with integrated air baffle/counter flange) are readily recyclable. EPDM seals can also be recycled.

Installation

18 General

18.1 The design of the layout of the roof outlets in the UV-System Siphonic Roof Drainage System should be in accordance with the recommendations given in BS EN 12056-3 : 2000.

18.2 The roof outlets should be placed at the roof low points to allow efficient flow of water to the outlets.

18.3 The system must be installed in strict accordance with the design. Small differences to pipework length/diameter can significantly affect the performance of the system.

18.4 Appropriate safety measures should be taken during installation, maintenance and use, to protect personnel working at height and to prevent hazards from falling objects.

18.5 The guidance given in the *UV-System Installation Manual* and BS 8490 : 2007, Clause 10, should be followed.

19 Procedure

19.1 An appropriately sized hole must be formed or cut in the roof structure or gutter to accommodate the outlet. The outlet must be secured to the roof structure (see Figure 2).

19.2 The BBA has not assessed individual installation details since they will depend on the roof construction.

19.3 Typical installation details not assessed by the BBA but indicated by the Certificate holder are shown in the *UV-System Installation Manual* (see also Figure 2 of this Certificate).

Technical Investigations

20 Tests

Tests were carried out and the results assessed to determine:

- dimensional accuracy
- maximum flow capacities
- watertightness
- resistance to loading.

21 Investigations

21.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

21.2 An evaluation of existing data was made to assess:

- resistance to chemicals
- suitability of materials
- durability
- ease of jointing to pipework
- practicability of installation.

21.3 An investigation was carried out to verify the scientific basis and the correlation with full-scale testing of the computer software used to design the installations.

Bibliography

BS 8490 : 2007 *Guide to siphonic roof drainage systems*

BS EN 1253-2 : 2015 *Gullies for buildings — Roof drains and floor gullies without trap*

BS EN 12056-3 : 2000 *Gravity Drainage Systems inside Buildings — Roof drainage, layout and calculation*

BS EN ISO 9001 : 2008 Quality management systems — Requirements

SAPOFLOW

(52.5)

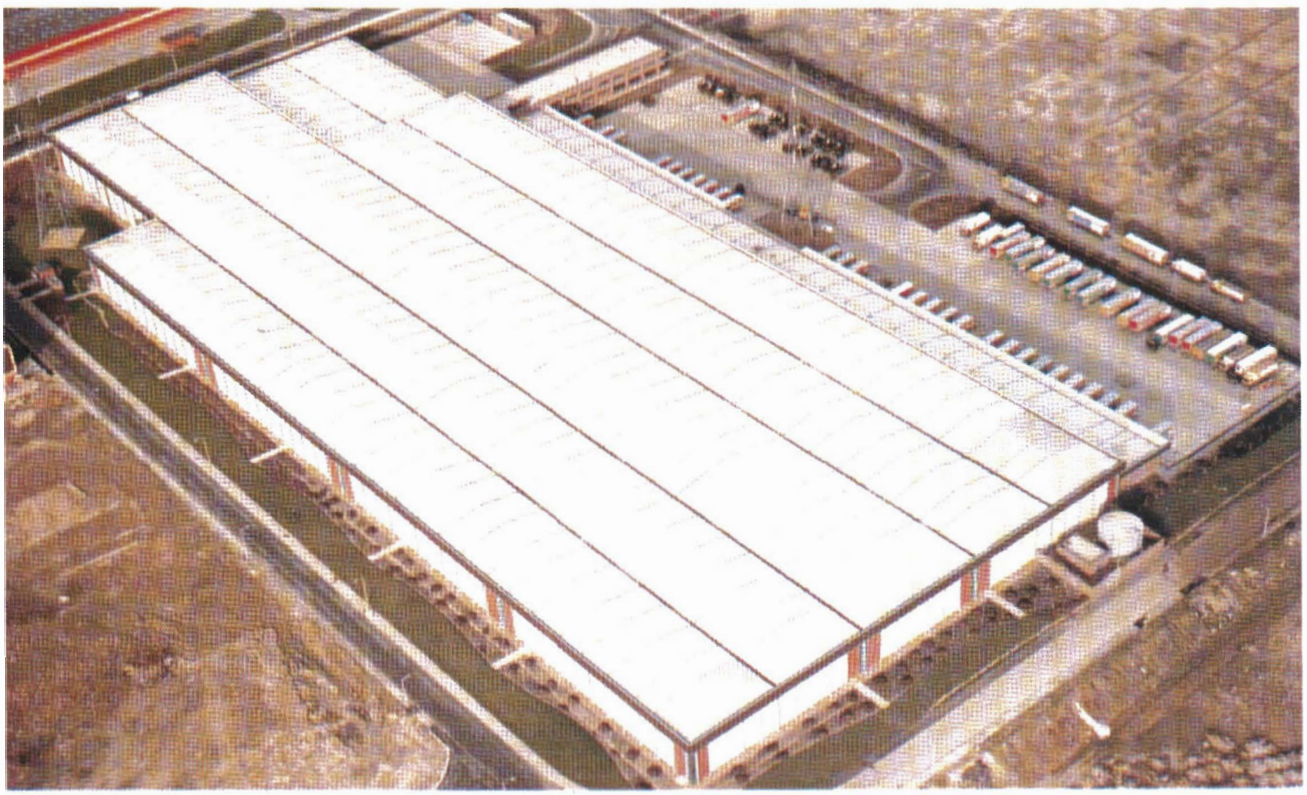
Sapoflow Limited

Sapoflow UV-System® siphonic roof drainage

A comprehensive service to the specifier in the design, manufacture and installation of high capacity, siphonic roof drainage systems individually tailored to specific buildings

The system features:

- **precise computerised design**
- **reduced roof penetration**
- **flexible downpipe siting**
- **exactly specified, minimal downpipe number and diameter**
- **corrosion resistant components designed for durability**
- **high flow rates**
- **rapid installation and low maintenance**
- **100% integral jointing system**

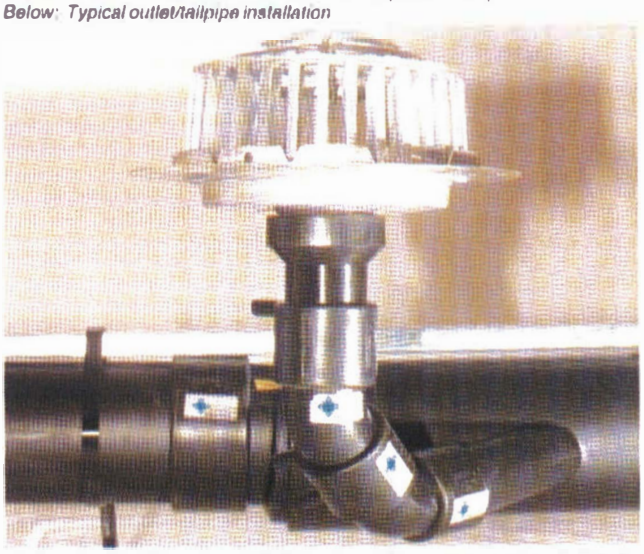


Above: Distribution centre for Wm Morrison Supermarkets plc
Below: Typical outlet/tailpipe installation

GENERAL

Introduction The Sapoflow UV-System utilises the hydraulic head or water pressure in a sealed pipework system running the distance from roof to ground discharge point of any building. Such a system depends on the ambient rainfall, roof size and shape and outfall requirements. The company's developed computer software determines the precise pipe dimensions and layout to fulfill the drainage requirements.
Economies are provided by the reduction of pipework and ground drainage, speed of installation and minimal on-site disruption.
Sapoflow limited offers a complete service to specifiers comprising planning and consultation, system design and quotation, provision of drawings, manufacture and supply of all components, installation and final testing.

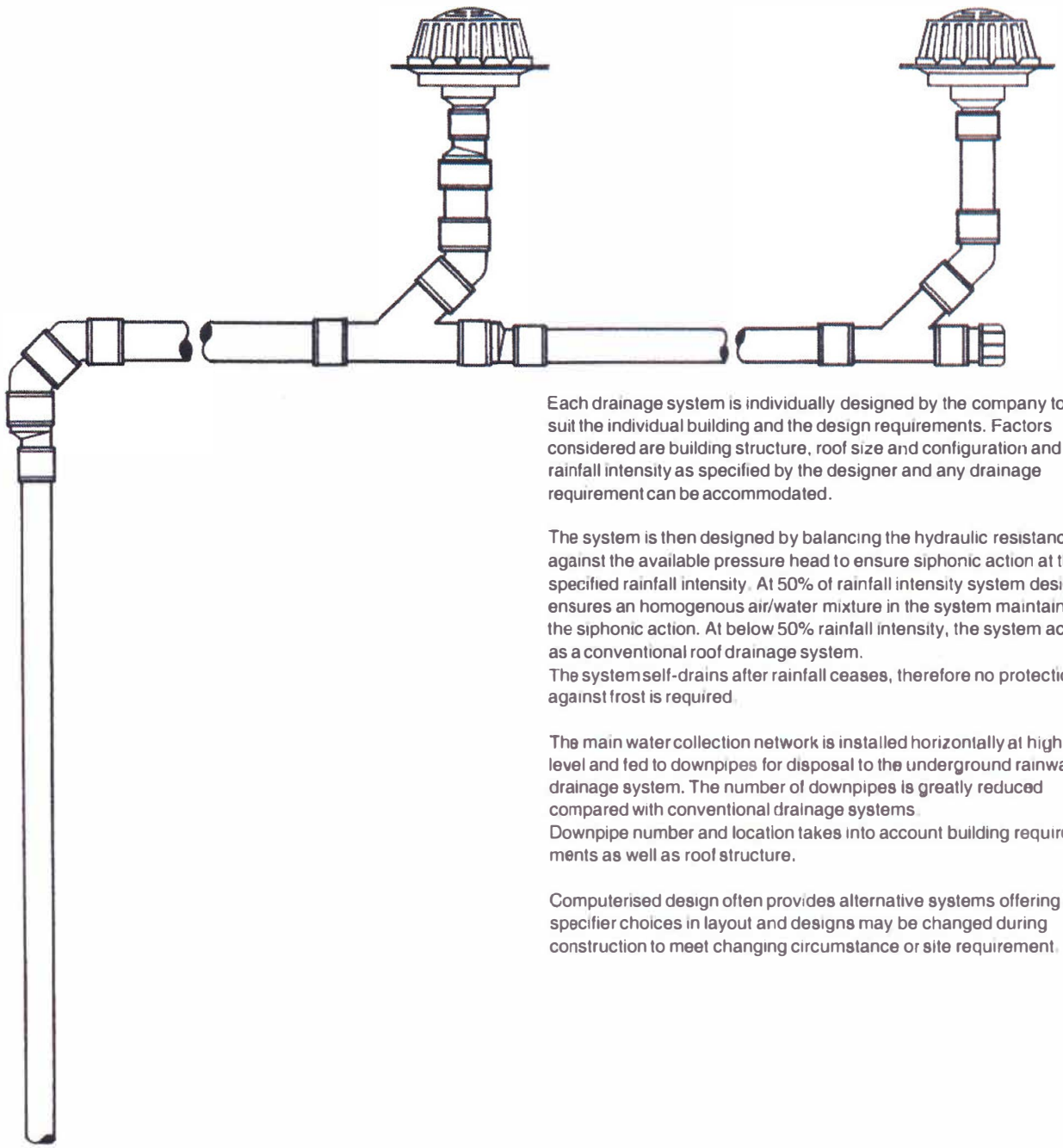
Applications The Sapoflow UV-System is suitable for all types and sizes of roofs, ranging from extensions and relurbishments requiring little change to existing structures to new projects with large roof areas such as warehousing, factories, offices, sports complexes, transport facilities, including airports, and retail developments.
Refurbishment includes the facility to introduce new systems to existing buildings, reducing the number of downpipes and amount of groundworks.



Authority The Sapoflow UV-System is widely accepted by Building Control departments. BBA certification of the UV-System is expected mid-1995.

® Registered trade mark

System design



Each drainage system is individually designed by the company to suit the individual building and the design requirements. Factors considered are building structure, roof size and configuration and rainfall intensity as specified by the designer and any drainage requirement can be accommodated.

The system is then designed by balancing the hydraulic resistance against the available pressure head to ensure siphonic action at the specified rainfall intensity. At 50% of rainfall intensity system design ensures an homogenous air/water mixture in the system maintaining the siphonic action. At below 50% rainfall intensity, the system acts as a conventional roof drainage system.
The system self-drains after rainfall ceases, therefore no protection against frost is required.

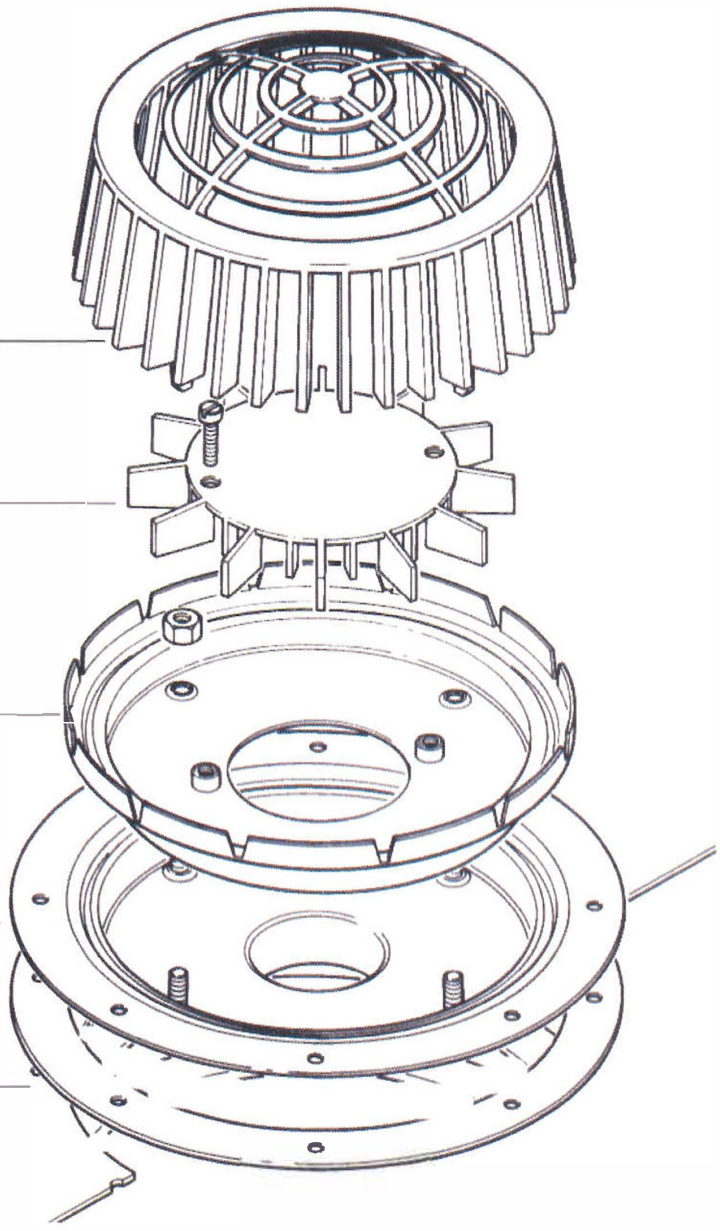
The main water collection network is installed horizontally at high level and fed to downpipes for disposal to the underground rainwater drainage system. The number of downpipes is greatly reduced compared with conventional drainage systems.
Downpipe number and location takes into account building requirements as well as roof structure.

Computerised design often provides alternative systems offering the specifier choices in layout and designs may be changed during construction to meet changing circumstance or site requirement.

System components

To fulfill the system's requirements components are selected from the company's range of Sapoflow UV-System roof outlets, AKATHERM® fittings, associated pipework and bracketry.

Roof outlets
The roof outlet is designed to ensure a water-only flow eliminating air intrusion at the design rainfall intensity.
Sapoflow UV-Systems are compatible with all types of roofing systems and matierials, and different sizes of guttering.



Leaf guard cast from high quality aluminium alloy (Siluminum) for high durability.

Cast Siluminum air-baffle for consistent, known performance.

Low profile outlet body for minimal roof penetration.

AISI 316 austenitic stainless steel components for superior corrosion resistance.

Reliable leak proof fixing for all types of waterproofing including mastic asphalt, BUR, single ply membranes and metal gutters.

Pipework
Sapoflow UV Systems utilise high specification pipework usually of high density polyethylene with joints utilising AKATHERM-EUROFUSION® range of electro-weld sockets and fittings.
However, other pipework materials, including copper, stainless steel, galvanised steel and cast iron, may be utilised.
Pipework comprises all standard joints, bends, branches and stop ends which are available, with straight pipe runs, in a range of diameters. These are used at different positions in any one system to cater for different flows.

AKATHERM® components are manufactured to DIN 19535/19537 with work procedures complying with the specifications of ISO 9001.
All polyethylene pipework dimensions are to DIN 8074.

Dimensions of pipework and fittings, are dictated by system design.

4. As Built Drawings

3.3.2 AB PDF Siphonic Drainage - Sapoflow

3.3.2 AB DWG Siphonic Drainage - Sapoflow

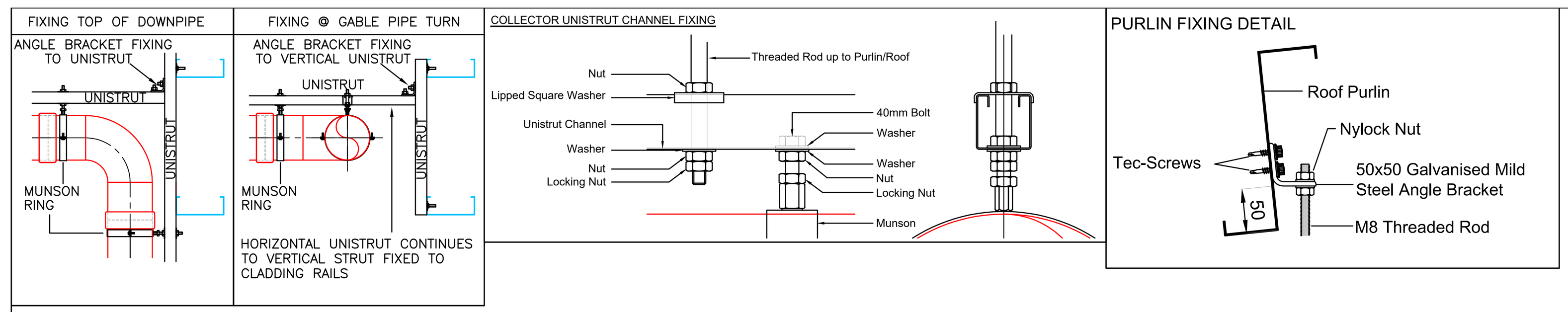
3.1 AS-BUILT DRAWINGS

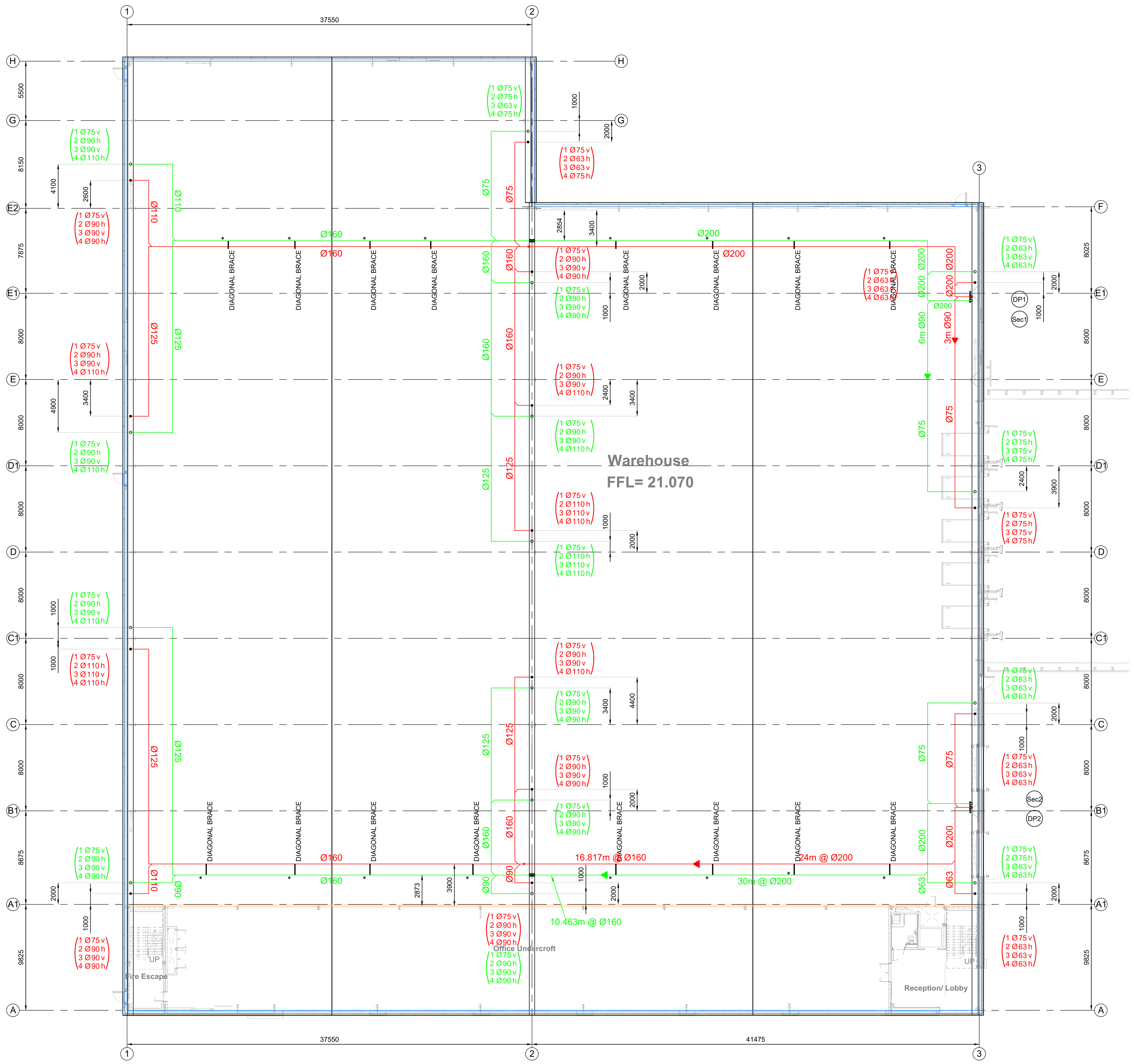
Please note that all drawings below are hyperlinked to the drawings listed in the below register. Please click on the drawing title to go directly to the drawing you wish to view.

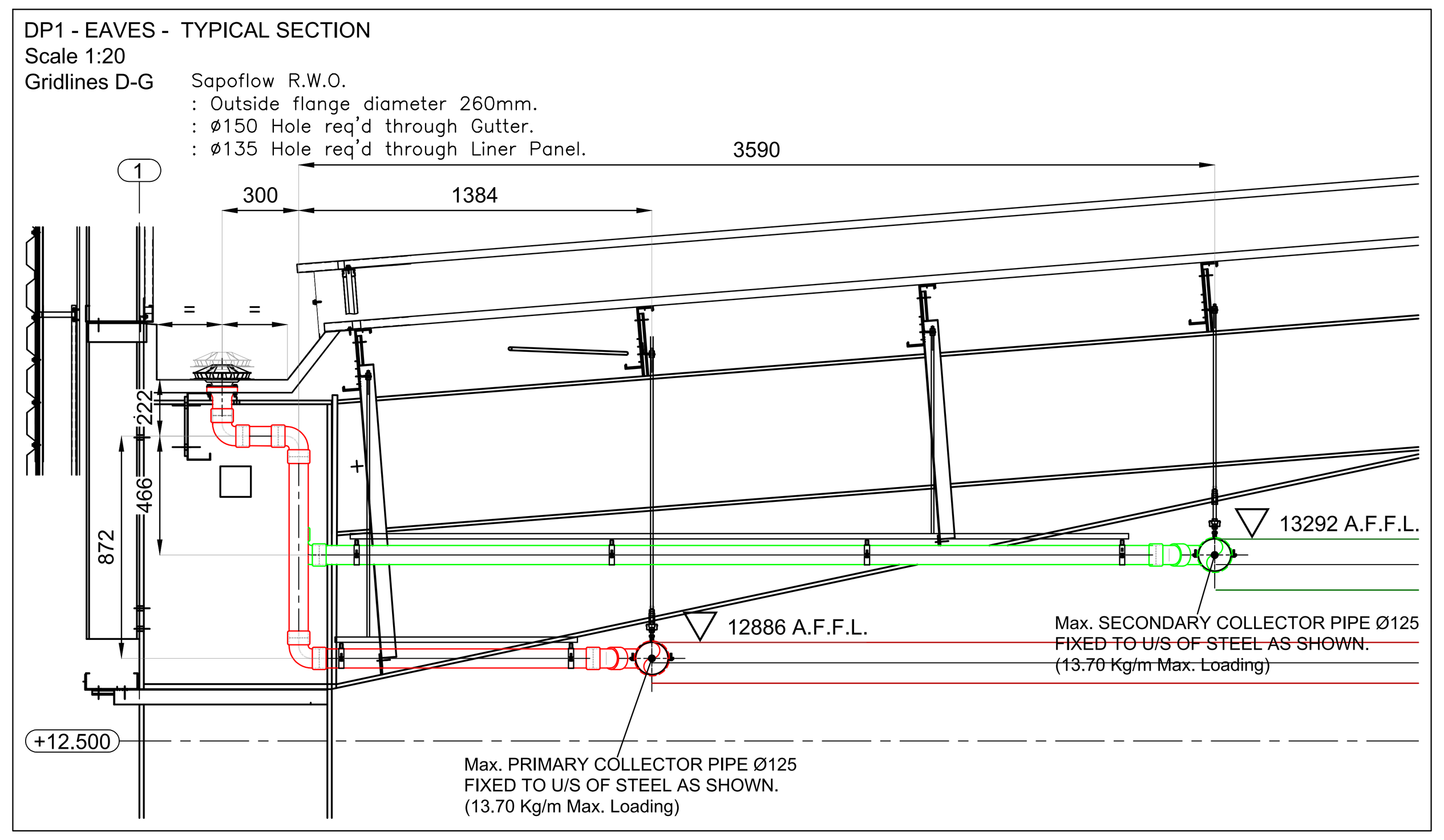
Drawing Register: Sapoflow Ltd

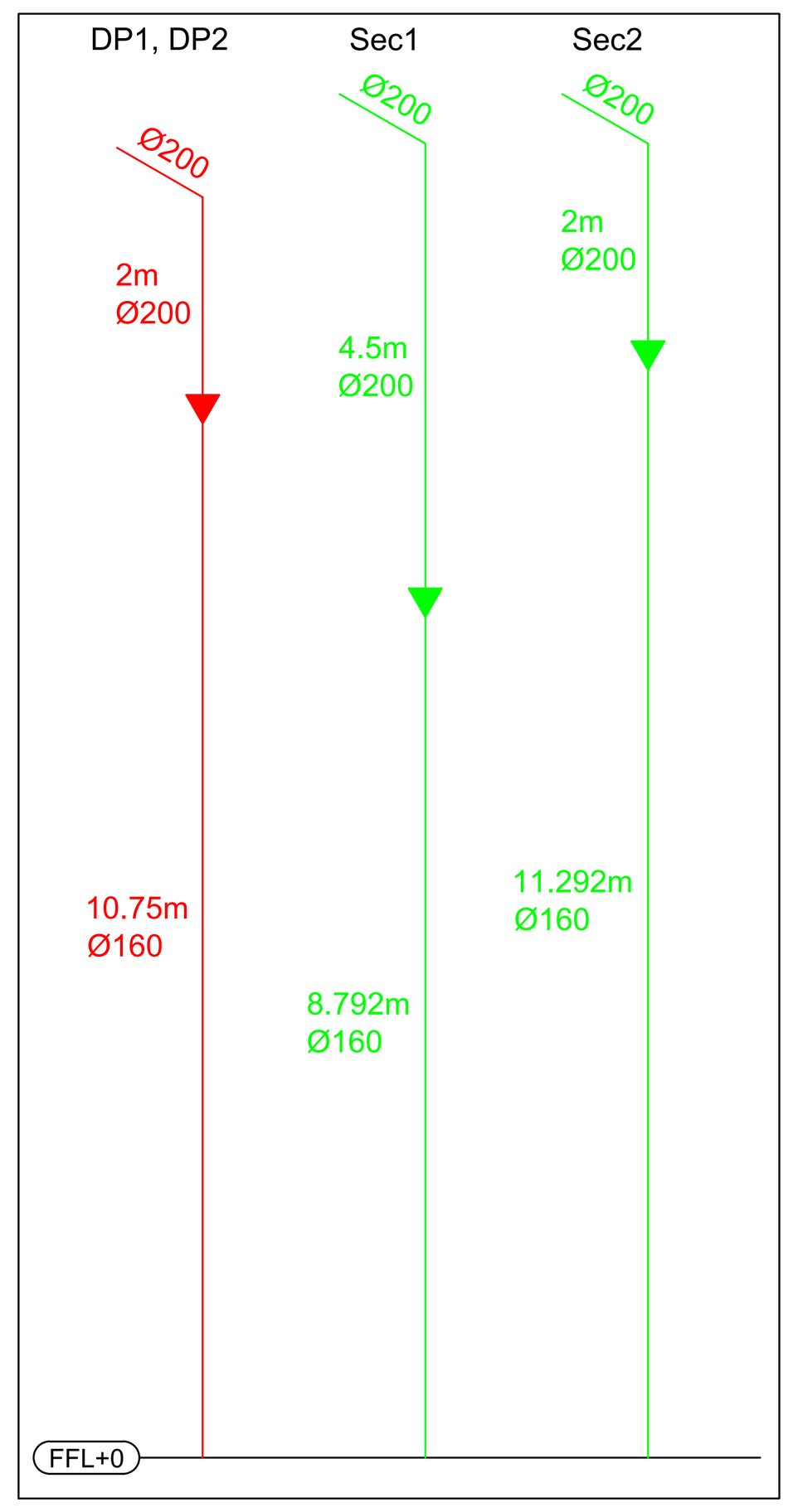
SIPHONIC DRAINAGE

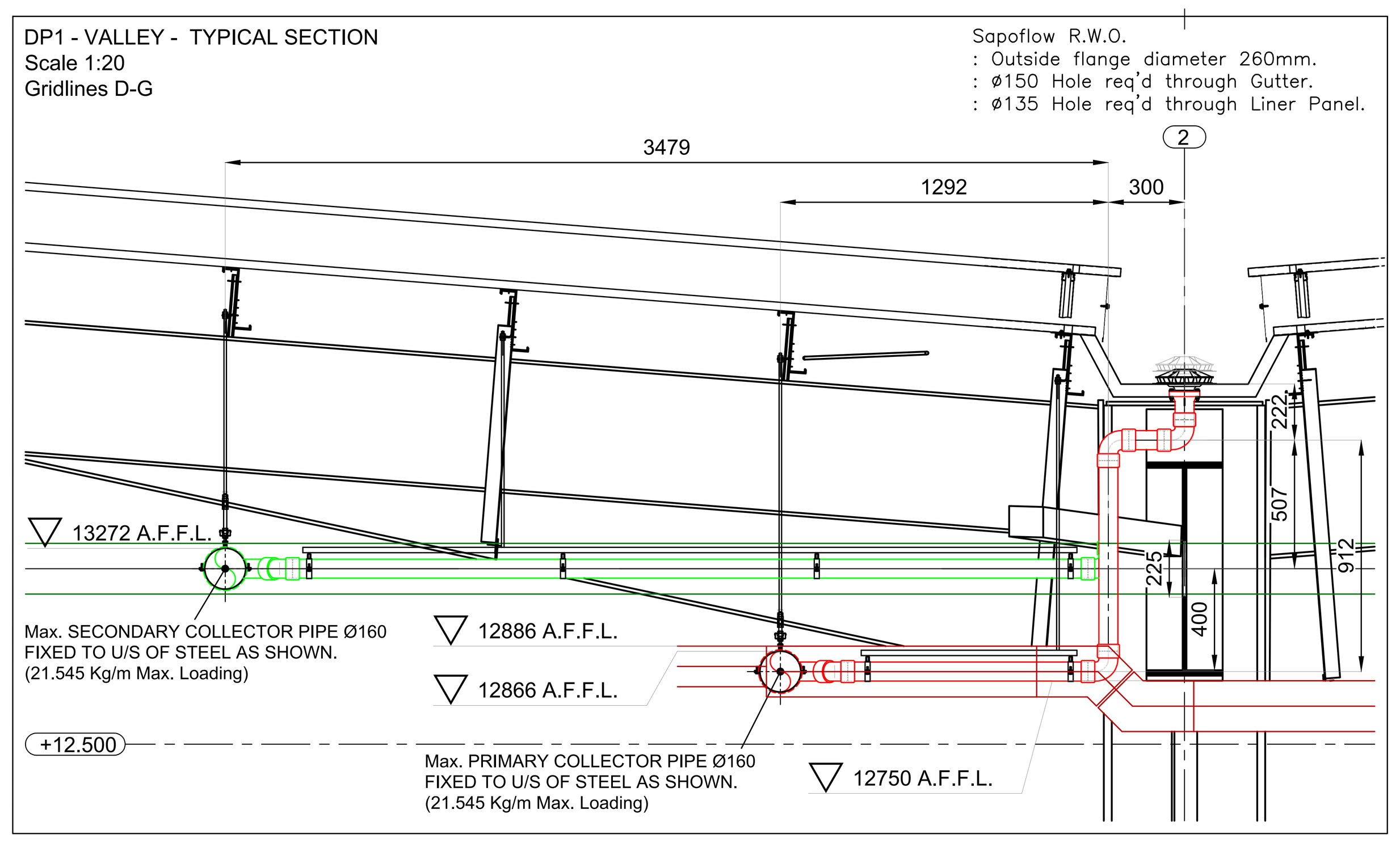
DRAWING NUMBER	DRAWING TITLE	REV
P23025-SAP-00-XX-DR-X-00001	Siphonic Roof Drainage Plan	C02
P23025-SAP-00-XX-DR-X-00002	Siphonic Underground Drainage Details	C02

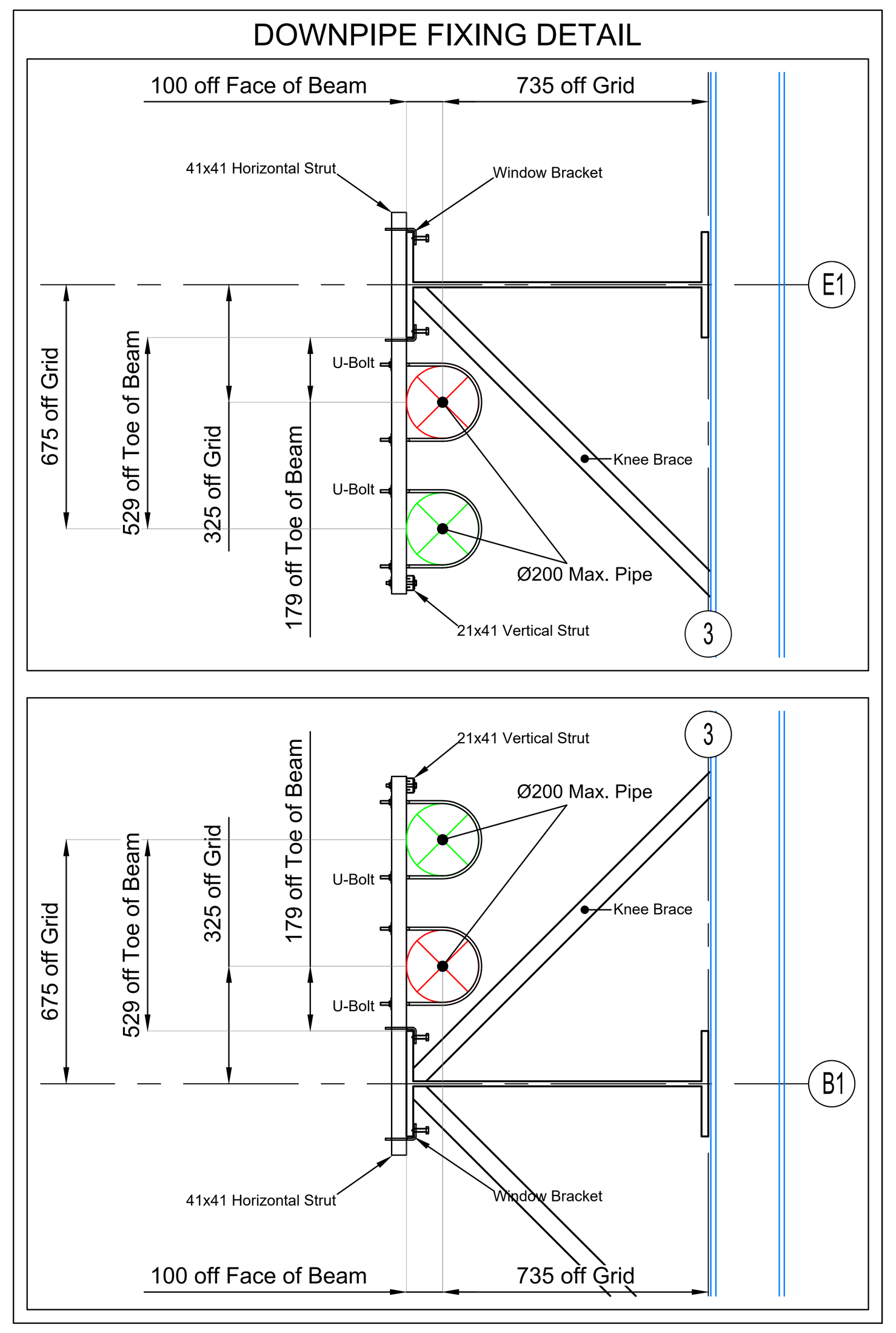


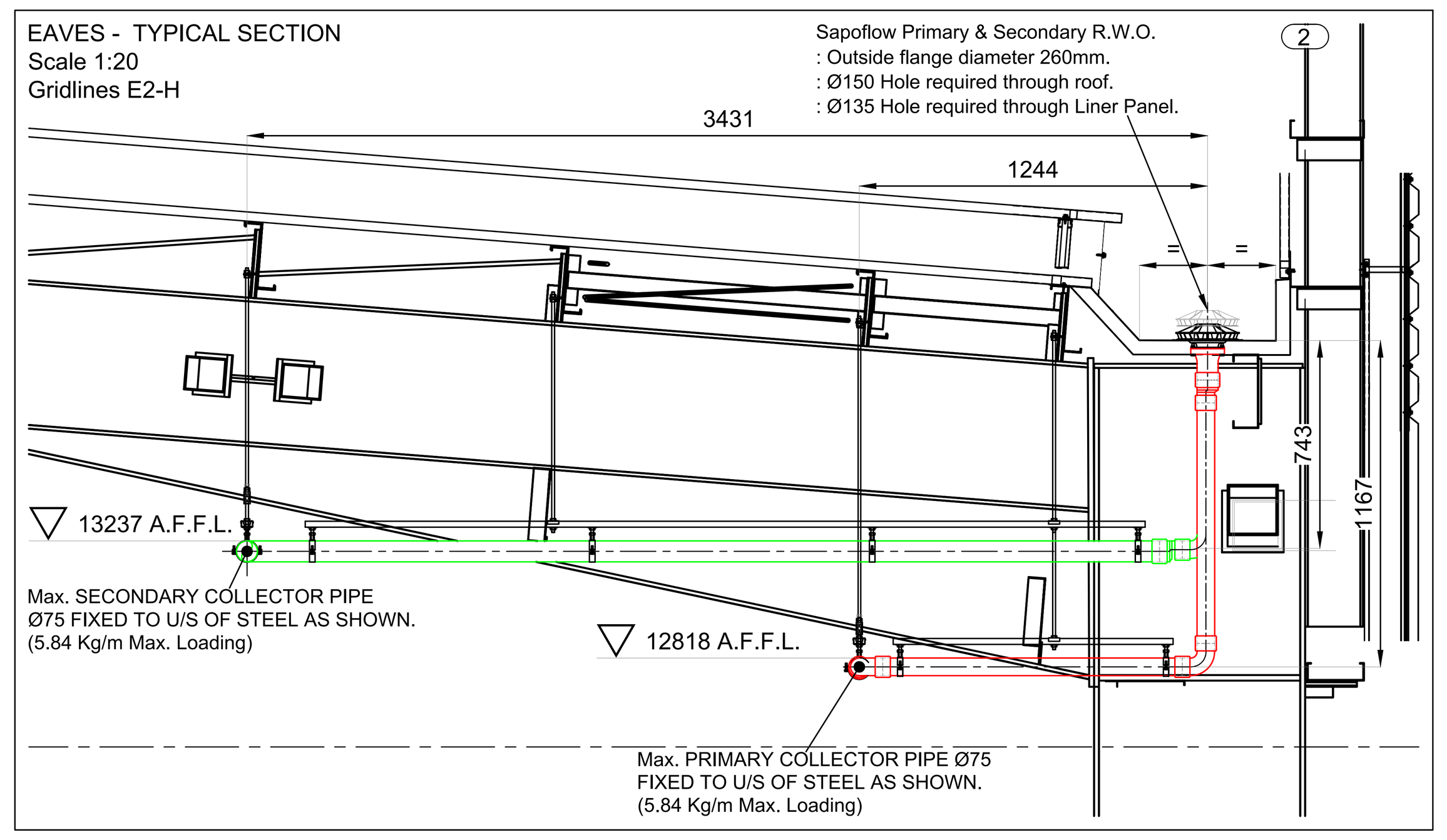


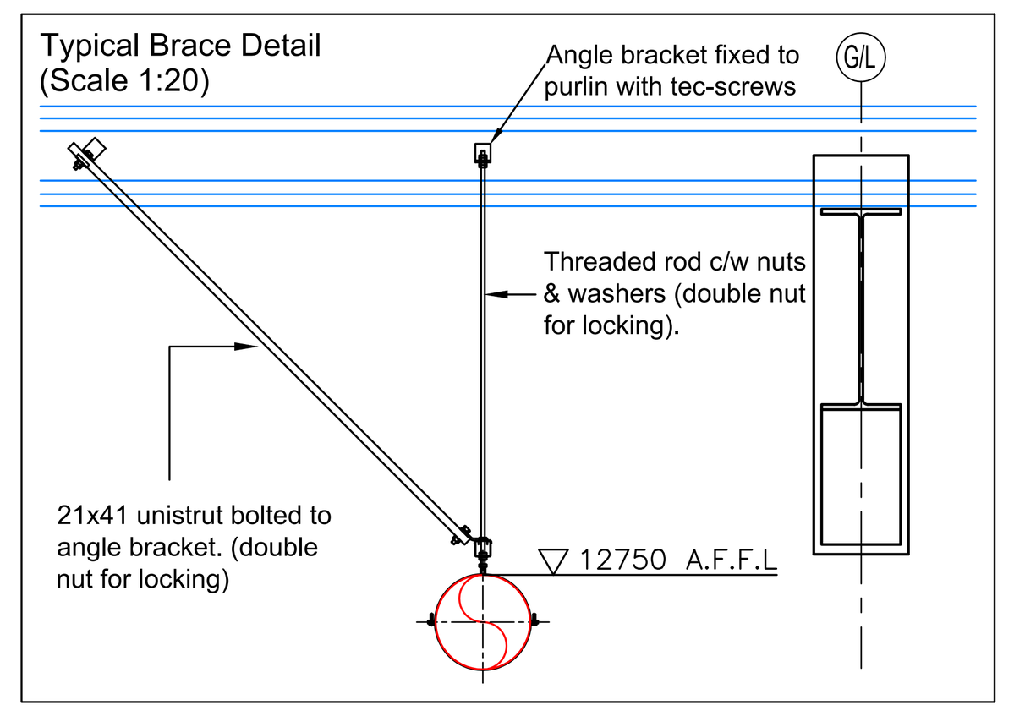


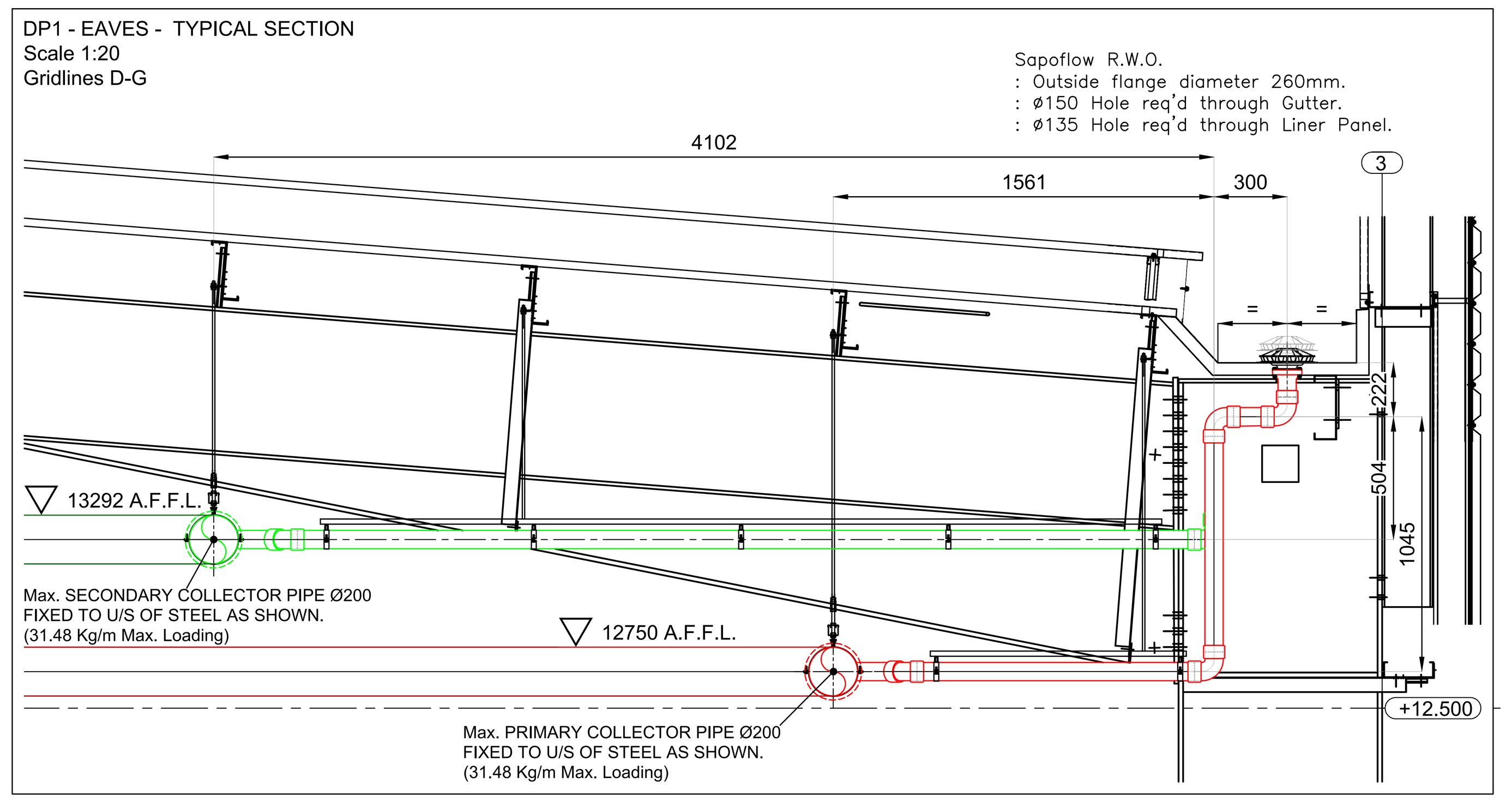












BUILDERSWORK PENETRATION SIZES

Pipe Ø	Penetration Ø	No.
50Ø	60Ø	
63Ø	73Ø	
75Ø	85Ø	
90Ø	100Ø	
110Ø	120Ø	
125Ø	135Ø	
160Ø	170Ø	
200Ø	210Ø	
250Ø	260Ø	
315Ø	325Ø	

BRACKET SPACINGS & LOADINGS FOR H.D.P.E. PIPE SUPPORTED FROM MAIN STRUCTURE: e.g. Roof Purlin

PIPE DIAMETER (mm)	BRACKET SPACINGS (mm)	LOADING PER BRACKET	PIPE DIAMETER (mm)	BRACKET SPACINGS (mm)	LOADING PER BRACKET
ø50	2000	6.76 Kg	ø125	2000	27.40 Kg
ø63	2000	9.07 Kg	ø160	2000	43.09 Kg
ø75	2000	11.68 Kg	ø200	2000	62.96 Kg
ø90	2000	15.58 Kg	ø250	1500	73.71 Kg
ø110	2000	21.87 Kg	ø315	1500	120.0 Kg

BRACKET SPACINGS & LOADINGS FOR H.D.P.E. PIPE SUPPORTED FROM UNISTRUT CHANNEL:
NOTE: 41x21 UNISTRUT FOR PIPES UP TO AND INCLUDING Ø160, 41X41 UNISTRUT Ø200 & ABOVE.

PIPE DIAMETER (mm)	BRACKET SPACINGS (mm)	LOADING PER BRACKET	PIPE DIAMETER (mm)	BRACKET SPACINGS (mm)	LOADING PER BRACKET
ø50	1000	3.38 Kg	ø125	1500	20.55 Kg
ø63	1000	4.54 Kg	ø160	2000	43.09 Kg
ø75	1000	5.84 Kg	ø200	2000	62.96 Kg
ø90	1500	11.69 Kg	ø250	2000	98.28 Kg
ø110	1500	16.40 Kg	ø315	2000	160.0 Kg

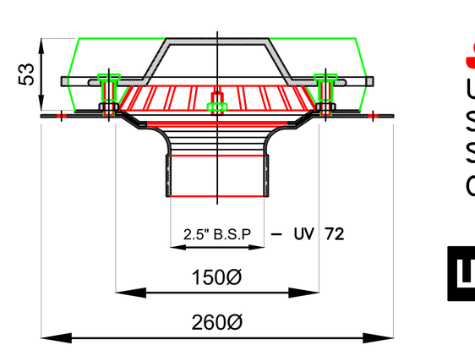
RAINFALL INTENSITY 252 mm/hr

ø90 DENOTES PIPE DIAMETER.
(ø63) DENOTES TAIL PIPE DIAMETER.

DOWNPIPE NUMBER.	DIMENSION DATA.	DISCHARGE FLOW (l/s)	DISCHARGE VELOCITY (m/s)
126 mm/hr Primary Systems.			
DP1	Downpipe To F.F.L See Isometric	118.89	2.84
DP2	Downpipe To F.F.L See Isometric	109.93	2.63
126 mm/hr Secondary Systems.			
Sec1	Downpipe To F.F.L See Isometric	118.89	2.84
Sec2	Downpipe To F.F.L See Isometric	109.93	2.63

Construction Record

REV	DATE	DESCRIPTION
C02	29/08/24	Issued as Construction Record
C01	14/05/24	Issued for Construction
P01	18/04/24	Initial Issue



SAPOFLOW UV72 STAINLESS STEEL SIPHONIC ROOF OUTLET.

MIN GUTTER SOLE 300mm / HOLE ø150mm

SAPOFLOW
Siphonic Roof Drainage Systems.

SAPOFLOW LIMITED ,
FALL BANK INDUSTRIAL ESTATE ,
DODWORTH , BARNSLEY ,
SOUTH YORKSHIRE , S75 3LS .

Telephone 01226 297200
Fax 01226 204038
E-mail info@sapoflow.com
Website www.sapoflow.com

PROJECT
PANATTONI
HORTON ROAD
POYLE

TITLE
SIPHONIC ROOF DRAINAGE PLAN

DESIGN	DRAWN	Checked
W. Beaumont	B.A /AutoCAD.	T.G

SCALE	DATE
1:200 @ A0	21/03/24

PROJECT No.	DRAWING No.	REV
23207	P23025-SAP-00-XX-DR-X-00001	C02

BBA BRITISH BOARD OF AGREMENT CERTIFICATE No.07/4438 UV ROOF DRAINAGE SYSTEM UV SYSTEM
Founding member of SRDA Siphonic roof drainage association
UV System DIN 19599
UK Representative of UV-System Registered in England No. 2717962
Document Ref: SAP.D001(1)

KEY REFERENCE :-

- ● Sapoflow Primary System R.W.O.
- (red line) Sapoflow Primary System Pipe Route.
- ⊗ Sapoflow Primary Down Pipe.
- o Sapoflow Secondary System R.W.O.
- (green line) Sapoflow Secondary System Pipe Route.
- ⊗ Sapoflow Secondary Down Pipe.
- ▶ Sapoflow Reducer location.
- (magenta line) Sapoflow Underground Pipe Route.

Do not scale from this drawing. Use figured dimensions only.
All dimensions are to be verified on site.
Pipe, outlet and fitting sizes and dimensions are subject to alteration in order to ensure optimum hydraulic performance.
This drawing has been produced utilising information supplied by others for which Sapoflow Ltd can accept no responsilbility.
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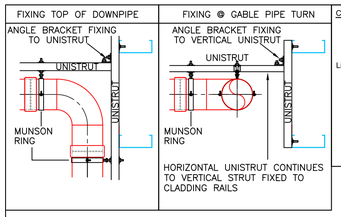
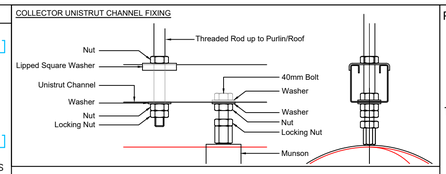
IF IN DOUBT, PLEASE CONTACT.

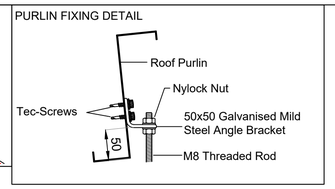
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the Hazards / Risks normally associated with the type of work detailed on this drawing, note the following:

1. Please refer to the O&M Manual for additional HSE Information







BUILDERSWORK PENETRATION SIZES		
Pipe Ø	Penetration Ø	No.
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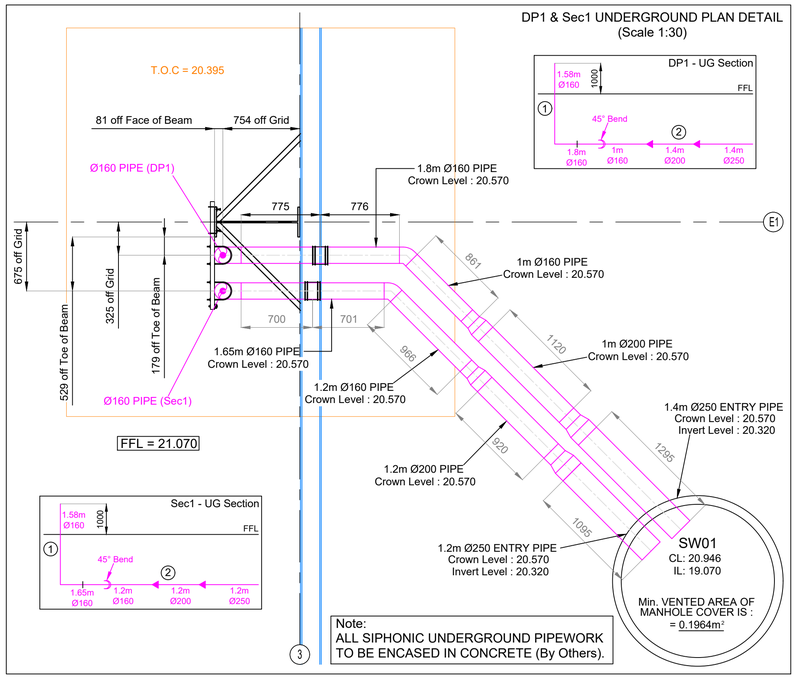
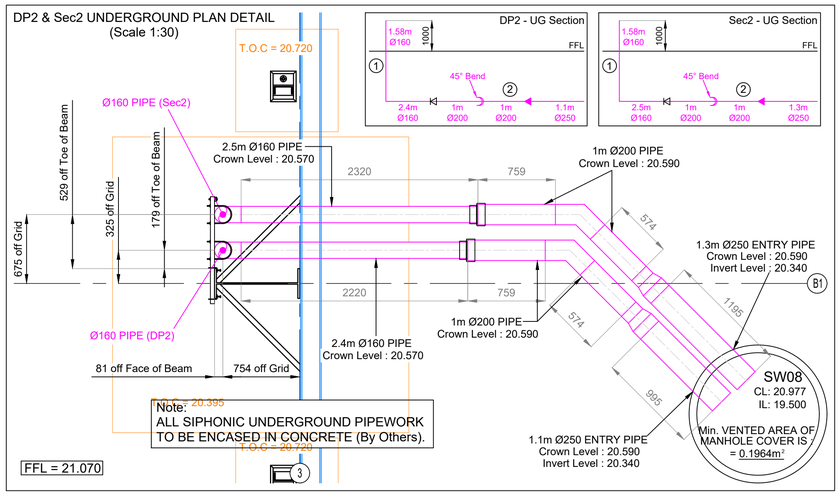
315Ø	325Ø	





BRACKET SPACINGS & LOADINGS FOR H.D.P.E. PIPE SUPPORTED FROM MAIN STRUCTURE: e.g. Roof Purlin

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RAINFALL INTENSITY: 252 mm/hr

ø90 DENOTES PIPE DIAMETER.
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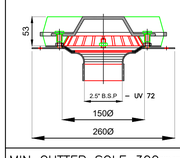
DP2	Downpipe To F.F.L See Isometric	109.93	2.63
126 mm/hr Secondary Systems.			
Sec1	Downpipe To F.F.L See Isometric	118.89	2.84
Sec2	Downpipe To F.F.L See Isometric	109.93	2.63

Construction Record

REV	DATE	DESCRIPTION
C02	29/08/24	Issued as Construction Record
C01	14/05/24	Issued for Construction
P01	18/04/24	Initial Issue



SAPOFLOW® UV72 STAINLESS STEEL SIPHONIC ROOF OUTLET.
uv-system®

MIN GUTTER SOLE 300mm / HOLE ø150mm

SAPOFLOW®
Siphonic Roof Drainage Systems.
SAPOFLOW LIMITED , FALL BANK INDUSTRIAL ESTATE , DODWORTH , BARNSLEY , SOUTH YORKSHIRE , S75 3LS .
Telephone 01226 297200
Fax 01226 204038
E-mail info@sapoflow.com
Website www.sapoflow.com

PROJECT
PANATTONI
HORTON ROAD
POYLE

TITLE
SIPHONIC UNDERGROUND DRAINAGE DETAILS

DESIGN	DRAWN	Checked
W. Beaumont	W.B /AutoCAD.	T.G

SCALE	DATE
1:30	17/04/24

PROJECT No.	DRAWING No.	REV
23207	P23025-SAP-00-XX-DR-X-00002	C02

KEY REFERENCE :-
⊗ Sapoflow Primary Down Pipe.
——— Sapoflow Underground Pipe Route.

Do not scale from this drawing. Use figured dimensions only. All dimensions are to be verified on site.
Pipe, outlet and fitting sizes and dimensions are subject to alteration in order to ensure optimum hydraulic performance.
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IF IN DOUBT, PLEASE CONTACT.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the Hazards / Risks normally associated with the type of work detailed on this drawing, note the following:

1. Please refer to the O&M Manual for additional HSE Information

UK Representative of UV-System Registered in England No. 2717962
Document Ref: SAP.D00(11)

5. Testing & Commissioning Results and Certificates

Sapoflow Limited
Fall Bank Industrial Estate
Dodworth, Barnsley, S75 3LS
Tel: 01226 297 200
E-Mail: info@sapoflow.com

SAPOFLOW

Sapoflow uv-system® Siphonic Roof Drainage

TEST AND INSPECTION CERTIFICATE

(This certificate must be completed as it forms part of the systems guarantees, operation and maintenance manuals)

Project Title Harbor Road Pogle **Project Ref** 23207

Installation Team R. Travis **Test Date** 23/7/24

Section / Phase / DP Nr's All Down Pipes

This certificate is to be signed by the main contractor / client to certify that the Siphonic Roof Drainage System(s) are complete in accordance with the relevant drawings and have been visually inspected by both parties

Tick as appropriate to confirm or comment accordingly

01) Please indicate the method of testing undertaken from **one** of the following options:
- a) The system has been visually inspected and an air test completed and witnessed in accordance with the current British Standards, at the time of testing all joints and fittings are sound and free from leaks — a) ☐
- b) Following heavy / torrential rainfall the system has undergone a working test and is deemed to be leak free by full agreement with the undersigned (Applicable where systems are made live prior to completion) — b) ☑
- c) In accordance with contract specification and prior agreement water has been supplied by the client and the system has been flooded, at the time of testing all joints and fittings are sound and free from leaks — c) ☐

Comments:

02) High level horizontal pipework is complete to the agreed routes and levels as per Sapoflow drawings ☑

Comments:

03) All pipework has been securely anchored to the building structure, and is adequately supported and sway braced ☑

Comments:

04) Downpipes are fully complete plumb and secure, and have been properly connected to the underground drainage ☑

Comments:

05) Where applicable, secondary discharge points are complete and external 45 degree bends have been fitted ☑

Comments:

06) Gutter outlet arrangement was complete and in good condition, clear of debris, and the Leaf guards fitted ☑

Comments:

07) All pipework is acceptably clean ☑

Comments:

08) All areas of works have been cleared of all Sapoflow's surplus materials, off-cuts, waste and debris ☑

Comments:

The undersigned confirm that the installation has been inspected and declared satisfactory in all the above respects

On behalf of	SAPOFLOW LIMITED	**On behalf of**	WINVIC
Signed		**Signed**	
Name	R. Travis	**Name**	A. J. FOKES
Position	Fitted	**Position**	Site Manager

The white copy is to be retained and returned to Sapoflow Limited, and the yellow carbon copy left with the appropriate site management

6. Operation

PERFORMANCE

Weather Sapoflow UV-System can be designed to fulfill designer's requirement to accommodate any rainfall intensity.

Mechanics Polyethylene pipework is resistant to impact, flexible under load with high abrasion resistance.

Water flow Tested at the Statens Provningsanstalt (Swedish National Testing Institute), Sapoflow UV-System outlets attained a flow rate of 12.2 l/sec. (ref. 89V20045).

Pollution All system components are proof against atmospheric corrosion.

Heat Polyethylene pipework and fittings operating temperature is -20°C to +80°C.

Light Polyethylene pipework and fittings are proof against UV light.

Compatibility The Sapoflow UV-System is compatible with all designs, types and materials of underground drainage systems.

Durability Systems, using polyethylene piping, have been successfully used in operation in Scandinavia for over 25 years.

MAINTENANCE

The Sapoflow UV-System is maintenance-free; however, the company recommends that the roof is inspected and maintained to BS 6367.
Sapoflow Limited offers a roof-maintenance service for roofs drained by a siphonic system or conventionally.

ECONOMICS

Guarantee The complete system is guaranteed for design, manufacture and performance during the specified life expectancy of the building.

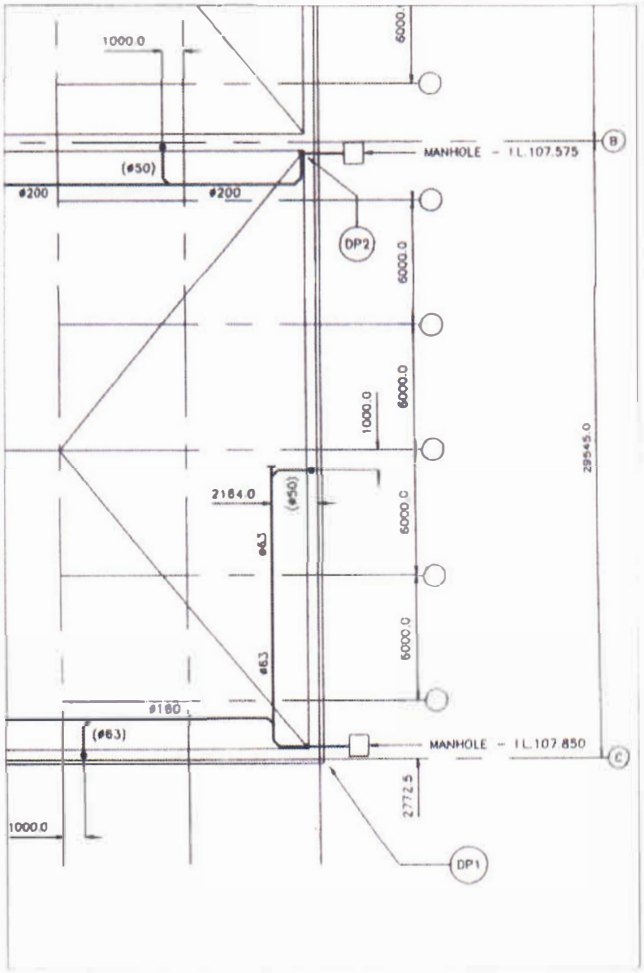
SERVICES

Sapoflow offers a complete comprehensive service to the specifier; this comprises the following elements:
planning stage consultation,
recommendations for meteorological conditions, overflow and underground drainage connections,
system design and quotation,
detailed and working drawings,
supply and manufacture,
installation,
site supervision and
roof maintenance.

REFERENCES

Sapoflow Limited have been involved in the design and installation of siphonic drainage systems in the following projects:

Project	*Roof area (m²)*	*Specifier*
Vector 2000 arena, Manchester	12760	Ove Arup & Partners
Retail units, Avonmeads, Bristol	20237	Broadway Malyan
MOD Tidworth Garrison	35808	Broadway Malyan



Working drawings produced on in-house CAD system

REFERENCES (cont'd)

Project	*Roof area (m²)*	*Specifier*
W M Smith, Andover	12326	Alan Edwards Partnership
New stand, Leeds United FC	6000	Hadfield Cawkwell Davidson & Partners
Europier Heathrow	6802	Hulley + Kirkwood
Argos Distribution Centre, Bridgwater	25635	Argos Limited
Sainsbury Store, Beckton	14772	Aukett Architects
Tesco Distribution Centre, Magor	46343	Wimpey Construction, Design & Build
Glaxo Laboratories, Stevenage	3620	Ove Arup Partners

SAPOFLOW
UV-SYSTEM

Sapoflow Limited
Fall Bank Industrial Estate
Dodworth
Barnsley, South Yorkshire S75 3LS
Tel: Barnsley (01226) 297200
Fax: (01226) 204038

7. Maintenance Procedures and Planned Maintenance

5) Maintenance

5.1) General Matters on Maintenance

- The Sapoflow System is self-cleansing at design rainfall intensity as a result of the siphonic effect which is created. This siphonic effect will occur at a reduced level of flow in light rainfall conditions as the unique rainwater outlet design sets up a homogenous mixture of water and air creating an apparent capacity flow and maintaining siphonic action. (Siphonic action has been witnessed under test at below 40% water capacity).
- The regularity of full capacity occurring, activating siphonic and self-cleansing properties, will be dependent upon the practical achievement of the rainfall intensity to which the System is designed. The greater the designed rainfall intensity, the longer the return period will be and the expectation of capacity flow will be correspondingly reduced. (With the exception of part or fully primed systems which will achieve capacity flow more frequently).

- Where design rainfall intensity, and hence capacity flow, can be achieved with reasonably regularity (twice per year) the self-cleansing property will occur and will keep the System free from further maintenance requirement.

- There are, however, peripheral areas which require maintenance if the efficient performance of the System is not to be impaired. Reference will be made to this under “Peripheral Maintenance” below.

5.2) Peripheral Maintenance

- The efficiency of the System relies upon the access of rainwater draining from the roof area to the gutters and thence into the rainwater outlet.

- Maintenance of the roof and particularly the gutter areas is, therefore, of prime importance, and is the responsibility of the Owner/Occupier of the building and is not the responsibility of Sapoflow.

- The attention of the Owner/Occupier of the building is, therefore drawn to: -

- The British Standard Code of Practice BS EN 12056-3:2000, Part 3: Roof Drainage, Layout and Calculation: -

  NE.5.1 Periodic Inspection and Cleaning
  “Gutters, rainwater pipes, outlets and gratings should be inspected and thoroughly cleaned once a year, or more often if the building is in or near an industrial area, or is near to trees, or may be subjected to extremes of temperature. The frequency of inspection and cleaning will need to be based on local experience. Defects should be remedied as soon as possible after being noted.”

- British Standard BS 8490:2007 Section 12 states as BS EN 12056-3:2000, Part 3 with the added note.

Note, During the first year of operation, it is recommended that inspection, etc. should be carried out four times a year in order to establish an appropriate maintenance regime. The regime should take account of autumn leaf fall and the fact that intense rainfall tends to occur during summer storms.
12.2 After any works on the roof, all debris should be removed and the outlets cleaned.
12.3 Where practicable, supports and fixings should be inspected annually and tightened and adjusted as necessary.
12.4 All cleaning, inspections, works, repairs, tests and any other relevant information should be kept in a maintenance log.
12.5 Baffles should not be removed except temporarily for cleaning.

- Sapoflow recommend cleaning and maintenance is carried out in line with the British Standards code of Practice at least a minimum of twice annually for gutters and roofs that incorporate siphonic systems with rainwater outlets and downpipes.

5.3) System Maintenance

- Electro Weld Joints - It is unusual for electro-fusion welded pipework joints to leak. However, where this is apparently, is in the case the following initial checks should be carried out: -

  a) Check for defective roofing/sealing.
  b) Check for defective gutter joints/sealing.
  c) Check for defective seal at sump installation point.

- Any defect/leak relating to the above could have the effect of water following, and dripping from, the exterior of the pipework and giving the impression that an electro-fusion joint is faulty when, in fact, this may not be the case.

- Suspected Blockages - If the System appears to be blocked and no discharge during rainfall is evident, check that all leaf guards/baffle plates are in place at each rainwater outlet point. A missing leaf guard/baffle plate may allow debris to enter the system which could result in a blockage. Missing leaf guards/baffle plates should be replaced immediately and should be regularly checked to ensure that they are free from obstruction. Where a leaf guard/baffle plate is missing and a blockage seems to have occurred as a result of debris entering the system, the pipework should be carefully rodded from the rainwater outlet itself. When using the rainwater outlet as entry point for rodding purposes **EXTREME CARE MUST BE TAKEN** as undue application of force may result in damage to the tailpipe and/or its associated fittings. After rodding great care must be taken to ensure the replacement, or renewal, of all leaf guards/baffle plates.

5.4) Periodic Maintenance

- Sapoflow Limited recommends maintenance is carried out in line with the British standards as noted above in point **5.2) Peripheral Maintenance** or as an absolute minimum twice-annually

- ***Note:* the twice-annual recommendation is a minimum and consideration should always be given to the building's surrounding environment in order to decide suitable periodic maintenance intervals.**

5.5) Maintenance Method Sequence:

- **Step 1:** Thoroughly clean all debris from roof, gutters, and rainwater outlet leaf guards/baffle plates. To ensure that debris does not enter the system it should be cleared away from the rainwater outlets, i.e. build up piles of debris midway between rainwater outlets.

- **Step 2:** Remove rainwater outlet grating (leaf-guard) and thoroughly clean debris from inside rainwater outlet bowl, care is to be taken to ensure debris does not enter the rainwater outlet orifice and connecting pipework.
  (If the system is part or fully primed an internal inspection via rodding of the tailpipe closest to the down-pipe should be undertaken to detect possible silt build up).

- **Step 3:** Inspect rainwater outlet to ensure that all components are present, in good condition, and are fitted correctly; components can slightly vary between types of outlet but include grating (leaf-guard), baffle plate, clamping ring/gravel guard, studs and nuts. Record any missing or damaged components.

- **Step 4:** Replace any missing or damaged components with new, care is to be taken to ensure all rainwater outlet components are fitted correctly and securely.
- **Step 5:** Repeat steps 2-4 for all rainwater outlets.

- **Step 6:** Remove all collected debris from roof to ground level and dispose of in a suitable location.

5.6) Maintenance / Repairs.

- If for whatever reason, should a repair be necessary on the siphonic drainage installation the company are not in a position to, and do not offer an emergency or out of hours repair service.

- First line maintenance should be attended to by the building owner/occupier's maintenance team. The company will always endeavor to attend to leaks/repairs as soon as possible but are restricted to the resources available at the time.

- Should Sapoflow be required to attend to remedial works through the life of the building the owner/occupier should be aware of the following points:

    - The owner/occupier is responsible for correctly identifying the source of the problem, should the company be called out in error to remedy a fault which is not part of the Sapoflow Ltd. siphonic roof drainage system or inclusive under the performance guarantee the owner/occupier is responsible to cover the associated costs.

    - The area of repair should be readily accessible by a mobile elevating work platform (MEWPs) to a height no greater than that specified in our original quotation or a mobile scaffold tower of a height no greater than 5 metres.
    - Any special requirements due to restricted access will be provided by the owner/occupier and are not the responsibility of the company.

    - Concealed pipe-work should be exposed prior to the company's site attendance i.e. the removal of ceilings, paneling, cladding panels, plasterboards etc. Likewise, the making good following repairs are not the responsibility of the company.

    - Warranty works are to be carried out within normal working hours 08:30h to 17:00h Monday to Friday should the owner/occupier insist works are to be carried out outside these specified periods all associated extra over costs are chargeable by the company.

8. Spares Information

Suggested Spare Materials

- As Sapoflow Siphonic pipe-work is manufactured in HDPE (High-Density Polyethylene) and the pipe connections are electro fuse welded there are not many easily retrofitted spare parts or materials that can be kept on site for use in emergencies.

- However, the following below are a few *suggestions* that may prove useful should an emergency situation occur. Most of the below items can be supplied by Sapoflow Limited, please contact us for a quote if you require more information.

Product	Description
Denso Tape	Normally supplied by the manufacturer in 10 metre rolls in various widths. Denso tape is British Gas approved, it seals against the ingress of water, and can be used on cracked or weeping joints as a temporary repair. Denso tape can be applied directly to a leaking joint and will reduce water ingress.
Polysulphide Sealant / Mastic	This product is useful for blocking small intermittent leaks on weeping joints but normally needs to be applied when the joint is dry.
Band-Seal Couplings	Band-seals are rubber hoses with jubilee clips attached at either end to make the seal. They are available in various sizes but sometimes require reducing rings to get the exact diameter necessary. Band seals can only be properly fitted by cutting out the offending section of damaged pipe, which normally necessitates two band seals and a small section of HDPE pipe. As there are numerous different pipe sizes it could prove difficult to ensure the correct size seal required is kept in stock on site. A single band seal can be used in place of a single fusion connector if a pipe is dislodged. In certain circumstances band seals can be utilized as a permanent repair.
65mm (2.5”) 0.5” BSP Pipe Plugs or Bungs (Standard size fits Standard 72mm outlet)	Pipe plugs or bungs can be used to block a rainwater outlet and prevent rainwater entering the system. These are useful if a tailpipe that cannot easily be accessed is dislodged. Pipe bungs are fitted into the rainwater outlets in the gutters which will prevent any water entering the outlet. Discretion should be applied prior to utilizing outlet bungs as blocking an outlet will allow a buildup of water in the gutter which in certain circumstances may lead to overtopping.

9. Guarantees and Warranties

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4) Product Guarantees and Warranties

4.1) Performance Guarantee

- To the conditions listed in Section II below Sapoflow guarantees that the System, as described in the "System Description" will: -

  a) Perform according to specification

  b) Remain watertight

  c) Be free from defects in materials and workmanship for 20 years (witnessed by date of Inspection and Test Certificate on handover of System to Client).

4.2) Performance Guarantee Conditions

- The above guarantee is given by Sapoflow subject to the following conditions: -

a) Sapoflow in providing this Performance Guarantee has assumed that any work that may need to be done will be done during normal working hours and can be safely carried out from a firm, clear and level base by means of a scissor hoist or an equivalent "vertical" reach cherry picker and/or a mobile tower scaffold.
Please note, the vertical height of tower scaffolds provided by Sapoflow Ltd are not to exceed 5 metres. Any special access requirements or impeded access requirements other than those stated are to be provided free of charge by the client and are not Sapoflow's responsibility.

b) Sapoflow shall be under no liability in respect of any defects in the System arising from defects in any drawing, design or specification supplied by the Client/Customer.

c) Sapoflow shall be under no liability in respect of any defect in the System arising from willful or accidental damage, negligence, abnormal working conditions, failure to follow instructions issued by Sapoflow (either oral or written), failure to follow the instructions contained in the Maintenance Schedule for the System or other misuse, alteration, modification, repair or disturbance to the system carried out without the prior approval and direction of Sapoflow.

d) Sapoflow shall be under no liability under the above guarantee, or any other condition or guarantee, if the total contract price for the System, subject only to agreed contract retention deductions, has not been paid in full by due date.

e) The above guarantee does not extend to parts, materials or equipment not manufactured by Sapoflow in respect of which the Client/Customer shall only be entitled to the benefit of any such warranty or guarantee given by the manufacturer to Sapoflow.

f) Subject to the express provisions of this Guarantee all warranties, guarantees, conditions and other terms implied either by Statute or Common Law are excluded to the fullest extent permitted by the Law.

g) Any claim by the Client/Customer based on any defect in quality or condition of the System, or its failure to correspond with specification, shall be notified to Sapoflow within a reasonable time after discovery of such defect or failure. Where any such claim in respect of the System is so notified to Sapoflow, Sapoflow shall be entitled to replace the System, or that part of the System in question, free of charge, or at the sole discretion of Sapoflow, refund to the Client/Customer the price, or proportionate part of the price, and thereafter Sapoflow shall have no further liability to the Client/Customer.

h) Except in respect of death of personal injury caused by the negligence of Sapoflow, Sapoflow shall not be held liable to the Client/Customer by reason of any representation, implied warranty, condition or other term of any duty at Common Law or under the express terms of any agreement for any consequential loss or damage (whether for loss of profit or otherwise), costs, expenses or others claims for consequential compensation whatsoever (whether caused by the negligence of Sapoflow, its employees, its agents or otherwise) which arise out of, or in connection with, the System or its use by the Client/Customer.

i) Sapoflow shall not be liable to the Client/Customer or be deemed to be in breach of this guarantee by reason or any delay in performance or failure to perform any obligation of Sapoflow in relation to the System if that delay or failure was due to any cause beyond the reasonable control of Sapoflow.

j) Without prejudice to the generality of the foregoing, the following shall be causes beyond the reasonable control of Sapoflow: -

   i. Act of God, Explosion, Tempest, Fire or Accident.

   ii. War or Threat of War, Sabotage, Insurrection, Civil Disturbance or Requisitions.

   iii. Act Requisition, Restrictions, Regulations, Bye-laws, Prohibitions or Measures of any kind on the part of any Governmental, Parliamentary, or Local Authority.

   iv. Import or Export Embargoes.

   v. Strikes, Lockouts, or other Industrial Actions or Trades Disputes (whether involving employees of Sapoflow or a Third Party).

   vi. Difficulties in obtaining Raw Materials, Labour, Fuel or Machine Parts.

   vii. Power Failure or Machinery Breakdown.

4.3) Matters Effecting Performance Guarantee

- The System is carefully designed in order to perform to specification. No alterations can be made to the System without approval from Sapoflow.

- Under no circumstances should the pipework be used to support other equipment, as the loadings for pipes and hangers have been the subject of careful calculation.

- Unauthorised interference will adversely affect the performance of the System and will negate the Performance Guarantee provided by Sapoflow.

4.4) Test Certificate

- On completion of the System installation, it will be subjected to a visual inspection to ensure satisfaction that all parts of the System are complete and fitted in accordance with specification and the supplied construction drawings. The systems will then be subject to a capacity fill static air test (or working test) to ensure the System is leak free. Only after completion of this test is the connection to ground drainage completed. An exception to this rule is in instances where drainage has had to be provided while the build progresses and prior to the entire systems being completed in these cases only a live working test is practical and the systems will be signed off accordingly.

- These tests are carried out in the presence of representatives from Sapoflow and the Client/Contractor.

- A hand over/completion certificate is signed by both parties, one copy being issued to the Client/ Contractor, and one copy being retained by Sapoflow.

- Note:

  a) We recommend immediately after completion of installation of the System, and prior to handover following the tests referred to above, that main contractor should inspect the Roof/Gutter area to ensure that all building debris that could potentially cause blockage to the System has been removed by the responsible parties and that all rainwater outlets are clear of blockage and free draining.

  b) The completion of the installation of the System usually occurs at an early stage of the overall project, and some time prior to overall contract completion and building handover to client. It is essential that Main Contractor site management ensure that the system is able to perform during the intervening period, particularly where work on Roof/Gutters is still proceeding after the date of test and handover of the System when, without site supervision, it would otherwise be possible for such building debris as mentioned in (a) above to occur and impede the efficiency of the System.

10. Replacement Strategy

Should the client require to replace part or all of the siphonic drainage on site they would need to make contact with Sapoflow to review.

11. Demolition Decommissioning or Disposal

COSHH Regulations

- All materials used by Sapoflow Limited are non-hazardous under the meaning of the COSHH Regulations

Demolition & Disposal

- The system as installed will only function as per the design specification whilst in its complete form. Modifications must **not** be undertaken without prior consultation with Sapoflow Limited.

- Design calculation printouts are available from Sapoflow Limited on request.

- If partial or complete removal of the system is required, it should be undertaken by Sapoflow Limited and with reference to the above statement.

- There may be retained water within the installed pipe system and suitable precautionary measures should be taken to protect the building and its contents.

- Polyethylene and fire:
    - High Density Polyethylene heated in the presence of air will melt at about 130°C and eventually ignite at a temperature of around 340°C to burn slowly with a blue flame giving off carbon monoxide, carbon dioxide, water and small quantities of various hydrocarbons and aldehydes without giving off smoke.
    - The combustion products are very similar to those generated from other organic materials such as paper and board. Although polyethylene will burn, other fuels are necessary to maintain and ensure complete combustion.
    - Should a fire involving polyethylene occur, any commonly available fire extinguisher may be used. Powder extinguishers are very effective, but do not have cooling ability for a deep-seated fire. Water sprays are especially effective in cooling and damping down a fire.
    - Polyethylene is unlikely to be the only factor in a total fire situation.
    - The above comments can only be of general nature since the conditions in a real fire can never be fully predicted. They will depend on many factors such as location, the oxygen availability and the presence of flammable materials.