



Shepherd Gilmour
Consulting Engineers

SALFORD VAN HIRE

CONDITION 18 SUDS MAINTENANCE

*Shepherd Gilmour Infrastructure Ltd.
3rd Floor Phoenix House,
45 Cross Street
Manchester
M2 4JF*

SECTION I FUTURE DRAINAGE MAINTENANCE

Operations & Maintenance Manual

The final issue construction plans for the development will be included within an O&M manual that is collated by the main contractor. This manual will contain the specific information related to the products used and additional details on the proprietary SuDS components installed onsite. A copy of the final issue drainage plans has also been included within **Appendix B** of this document.

General Drainage Maintenance

The End-User(s) will be provided a copy of the O&M Manual to ensure that the onsite drainage network, within their responsibility undergoes regular maintenance checks.

The maintenance work will be undertaken by an appointed Maintenance Contractor and will generally include, jetting, vacuumation and a visual/CCTV survey to check the structural condition of pipes and manholes.

SuDS Maintenance

In addition to the standard underground and surface level drainage. The development also has the following onsite SuDS components which must also undergo regular maintenance.

- *Cellular Storage*
- *Full Retention Separators*
- *Flow Control Chambers*

The required maintenance for each item has been highlighted in Table I.

In **Appendix A** we have included the manufacturers own recommendation data sheets for the individual SUDS elements as follows

Cellular Storage	Yess Modular Geo-Void System Maintenance & Access
Flow Control Chamber	ACO QBrake Vortex – refer to page 12 for maintenance
Petrol Interceptor	Full retention separator data sheet. Refer to page 9 Section 8

Record Keeping

Detailed maintenance records must be kept by the Maintenance Company and the End User for any works undertaken and must be available for inspection when requested.

Operation and Maintenance Activity	Suds Component		
	Cellular Storage	Full Retention Separator	Flow Control Chambers
Regular Maintenance – Monthly Basis			
Inspection	●	●	●
Litter and debris removal	○	○	○
Grass cutting	○		
Weed and invasive plant control			
Shrub management			
Shoreline vegetation management			
Aquatic vegetation management			
Occasional Maintenance – Annually or as required			
Sediment management	●	●	●
Vegetation replacement			
Vacuum sweeping and brushing			
Remedial Maintenance – As required			
Structure rehabilitation/repair	○		
Infiltration surface reconditioning			

● Will be required ○ May be required

Table I SuDS Maintenance Management

APPENDIX A

Modular Geo-Void Systems

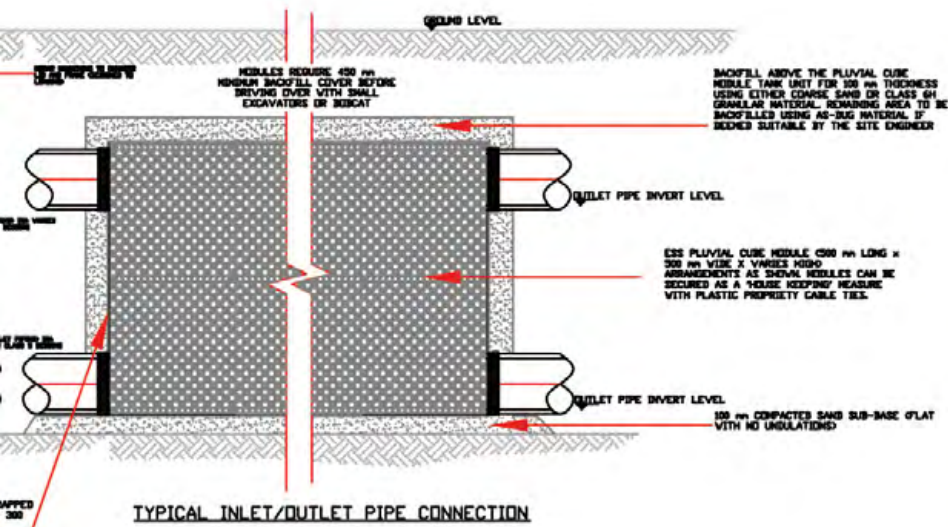
Total Water Management

Maintenance & Access



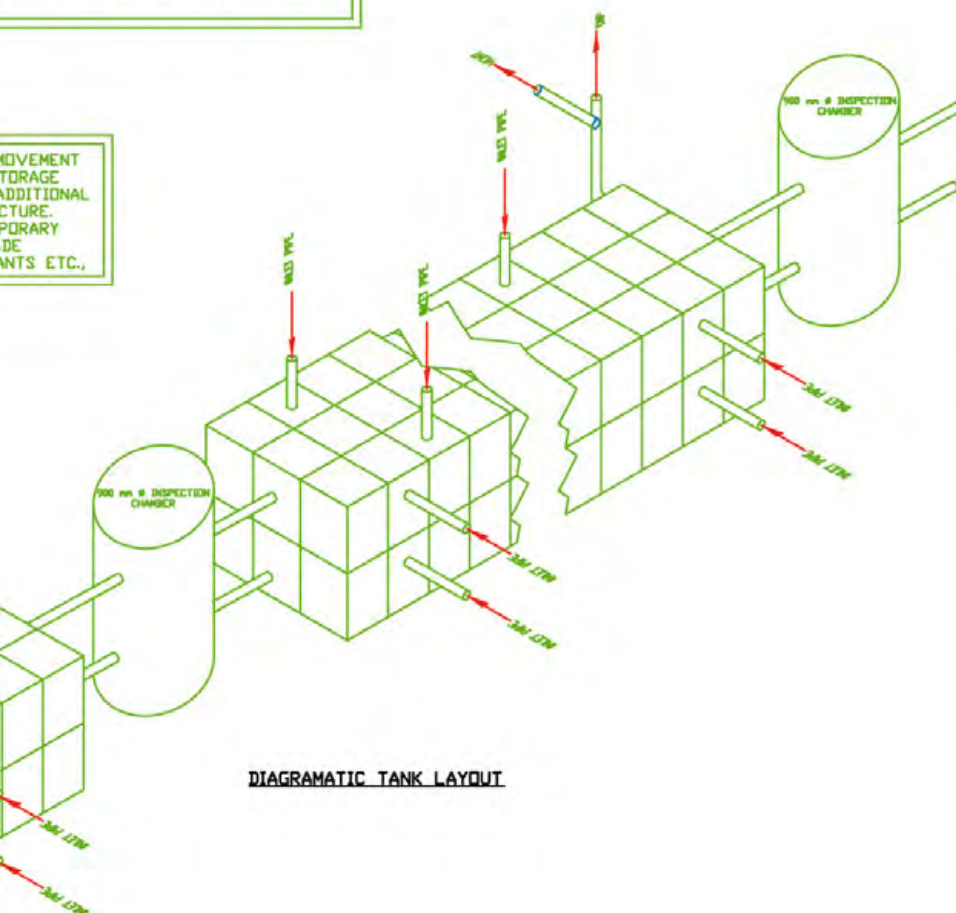
ENVIRONMENTAL SUSTAINABLE SOLUTIONS LTD

Pluvial Cube



CBR HAS BEEN ASSUMED AT SUB-BASE. SHOULD THE CBR BE TESTED AND FOUND TO BE LESS THAN 3% THEN THE ENGINEER SHALL BE NOTIFIED. ALSO, ANY SOFT SPOTS FOUND AT SUB-BASE LEVEL SHALL BE REPORTED TO THE ENGINEER.

MOVEMENT
STORAGE
ADDITIONAL
TURE.
PORARY
DE
ANTS ETC.,



900x300x150 HALF
BATTERED PRECAST
CONCRETE KERB
(HYDRAULICALLY PRESSED)

10mm THICK CLASS 1
MORTAR BED

CONCRETE BACKING
GRADE SRC 20

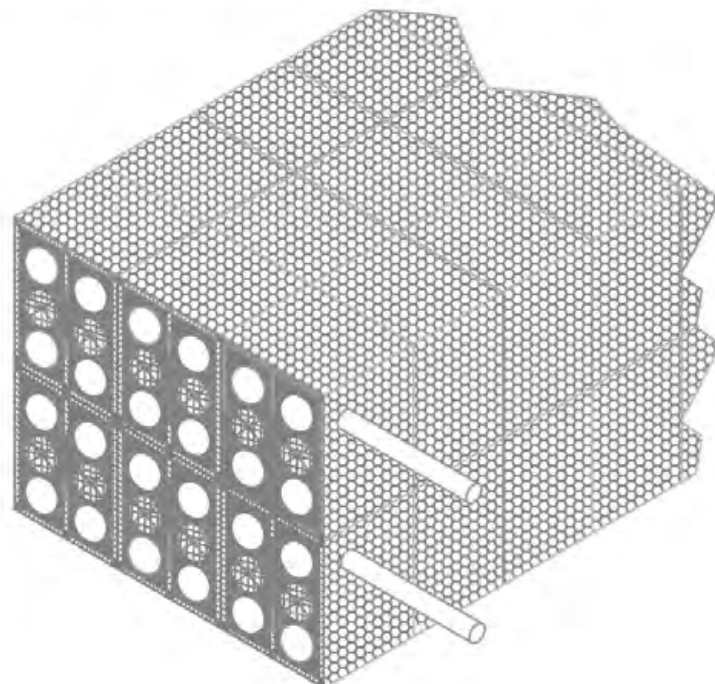
MINI 1:60 SLOPE

300 mm FILTER MEDIA

ESS PLUVIAL CUBE MODULAR UNIT (500 mm
LONG x 500 mm WIDE x 1075 mm HIGH)
ARRANGEMENTS AS SHOWN. MODULES TO BE
INTERLINKED IN ACCORDANCE WITH ESS
SPECIFICATION (SUPPLIED BY ALDERBURGH
LIMITED)

ESS PLUVIAL CUBE MODULAR UNIT TO BE
WRAPPED WITH PERMEABLE GEOTEX 225 FF
WITH 300 mm LAPPED JOINTS. (AS SUPPLIED
BY ALDERBURGH LIMITED).

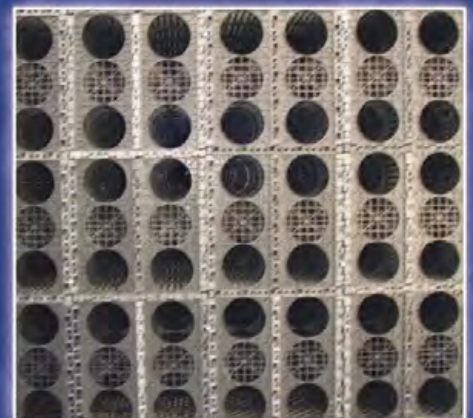
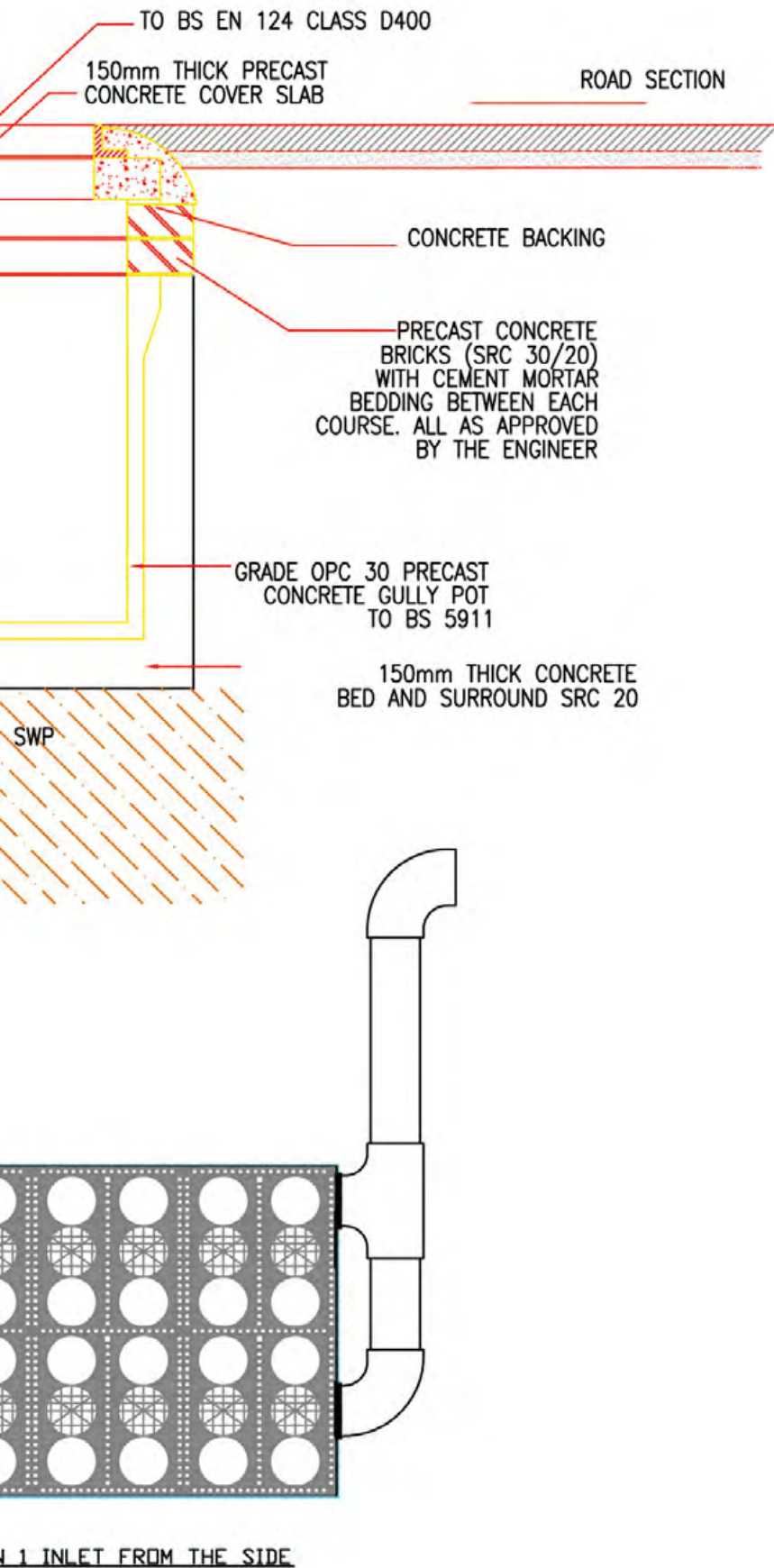
OPTION 1 INLET FROM THE TOP



OPTION

DIAGRAMATIC TANK LAYOUT

Pluvial Cube



THE CONTRACTOR SHALL PROHIBIT THE MOVEMENT OF CONSTRUCTION PLANT ACROSS THE STORAGE TANK AND WHERE NECESSARY PROVIDE ADDITIONAL SUPPORT AND PROTECTION TO THE STRUCTURE. PARTICULARLY POST CONSTRUCTION, TEMPORARY FENCING CAN BE USED TO PROHIBIT TRADE STOCKS, PILING MATERIALS, HEAVY PLANTS ETC.

PIPES CONNECTED TO THE SOAKAWAY TANK USING HEAVY DUTY PIPE COLLARS INSERTED INTO THE PERMEABLE GEOTEXTILE 225 FF WRAPPED AROUND THE TANK WITH STAINLESS STEEL STRANGLE BANDS FOR FASTENING AROUND THE PIPE (AS SUPPLIED BY ALDERBURGH LIMITED).

BACKFILL AROUND THE SIDES OF PLUVIAL CUBE MODULE FOR 100 mm THICKNESS USING COARSE SAND OR CLASS 6H SELECTED GRANULAR MATERIAL. REMAINING EXCAVATED AREAS TO BE BACKFILLED WITH CLASS 6H OR 6P GRANULAR MATERIAL IN ACCORDANCE WITH MCHV VOLUME 1 OR SIMILARLY APPROVED SPECIFICATION

MANHOLE SUMP WITH GRAVEL BASE FOR SILT COLLECTION 200 mm BELOW PIPE INVERT LEVEL.

TYPICAL MANHOLE / INSPECTION CHAMBER (TO ENGINEERS SPECIFICATION)

ESS PLUVIAL CUBE MODULES TO BE WRAPPED WITH PERMEABLE GEOTEXT 225 FF WITH 300 mm LAPPED JOINTS. GAS SUPPLIED BY ALDERBURGH LIMITED.

MODULES REQUIRE 450 mm MINIMUM BACKFILL COVER BEFORE DRIVING OVER WITH SMALL EXCAVATORS OR ROBCAT

TYPICAL DETAILS OF LINEAR RUNOFF COLLECTION SYSTEM USING PLUVIAL CUBE MODULE UNIT

CROSS SECTION

PIPES CONNECTED TO THE SOAKAWAY TANK USING HEAVY DUTY PIPE COLLARS INSERTED INTO THE PERMEABLE GEOTEXTILE 225 FF WRAPPED AROUND THE TANK WITH STAINLESS STEEL STRANGLE BANDS FOR FASTENING AROUND THE PIPE (AS SUPPLIED BY ALDERBURGH LIMITED).

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TYPICAL DETAILS OF LINEAR RUNOFF COLLECTION SYSTEM USING PLUVIAL CUBE MODULE UNIT

SECTION VIEW A - A (PLAN)

A 3 - 5% CBR HAS BEEN ASSUMED AT SUB-BASE LEVEL. SHOULD THE CBR BE TESTED AND FOUND TO BE LESS THAN 3% THEN THE ENGINEER SHALL BE NOTIFIED. ALSO, ANY SOFT SPOTS FOUND AT SUB-BASE LEVEL SHALL BE REPORTED TO THE ENGINEER

BACKFILL ABOVE THE PLUVIAL CUBE MODULE TANK UNIT FOR 100 mm THICKNESS USING EITHER COARSE SAND OR CLASS 6H GRANULAR MATERIAL. REMAINING AREA TO BE BACKFILLED USING AS-BUG MATERIAL IF DEEMED SUITABLE BY THE SITE ENGINEER

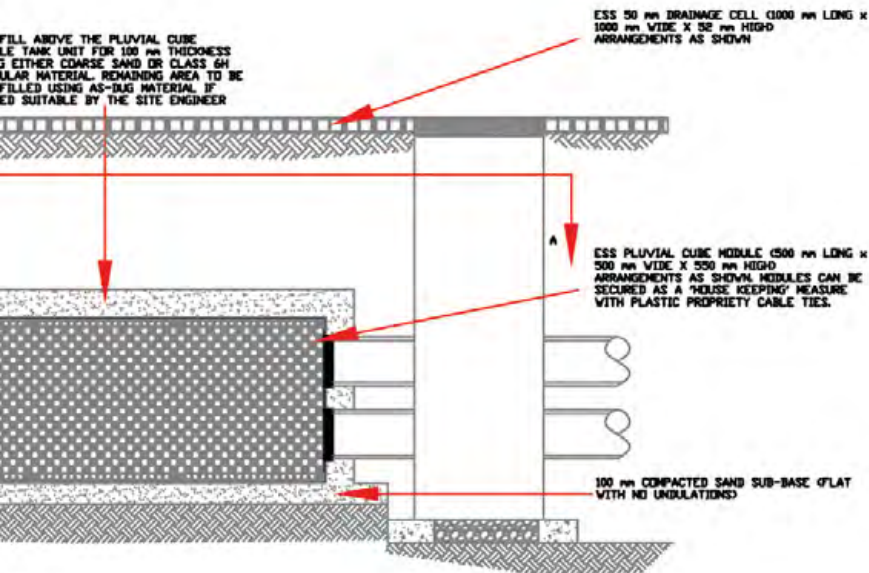
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PIPE CONNECTED TO MANHOLE FOR INSPECTION IF NECESSARY

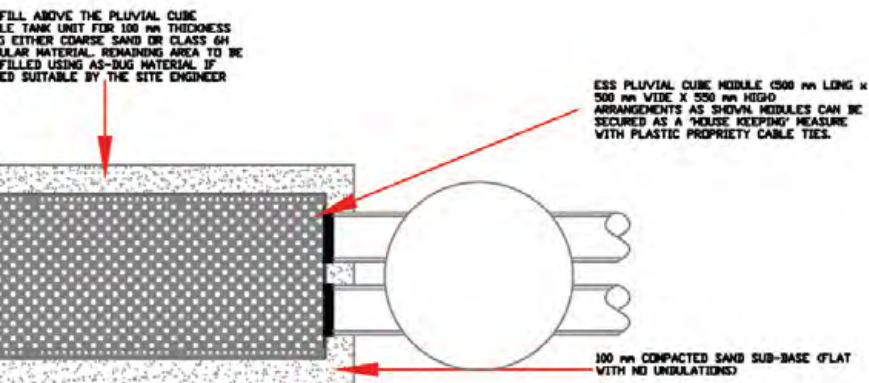
TYPICAL DETAILS OF LINEAR RUNOFF COLLECTION SYSTEM USING PLUVIAL CUBE MODULE UNIT

SIDE VIEW

Pluvial Cube



TYPICAL MANHOLE / INSPECTION
CHAMBER
(TO ENGINEERS SPECIFICATION)



TYPICAL MANHOLE / INSPECTION
CHAMBER
(TO ENGINEERS SPECIFICATION)

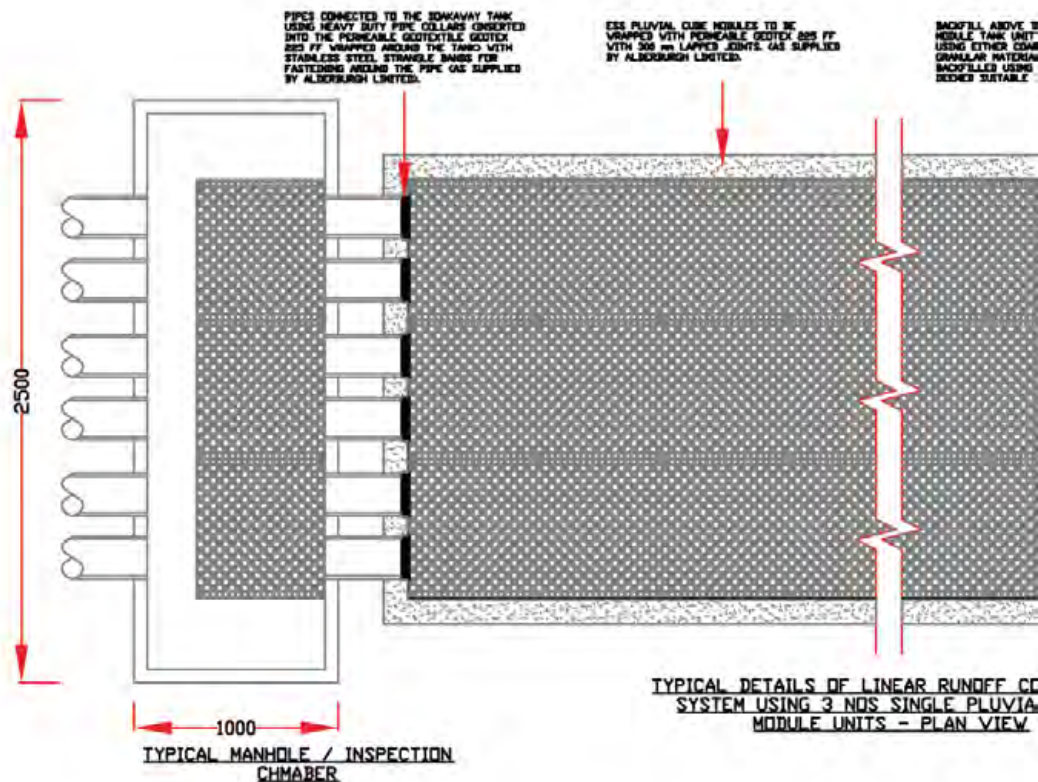
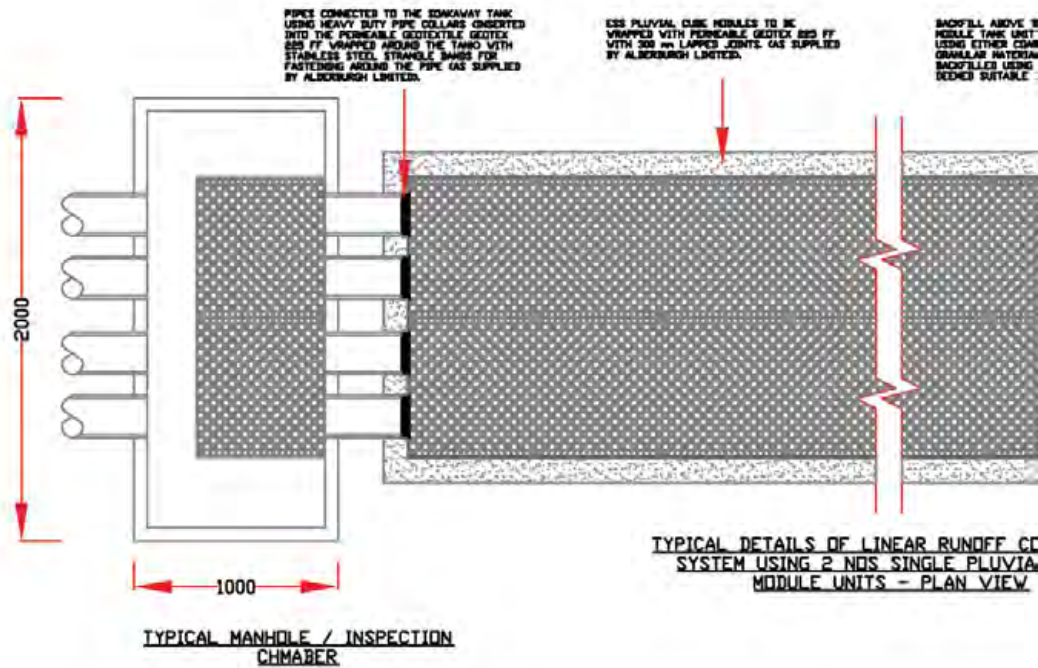
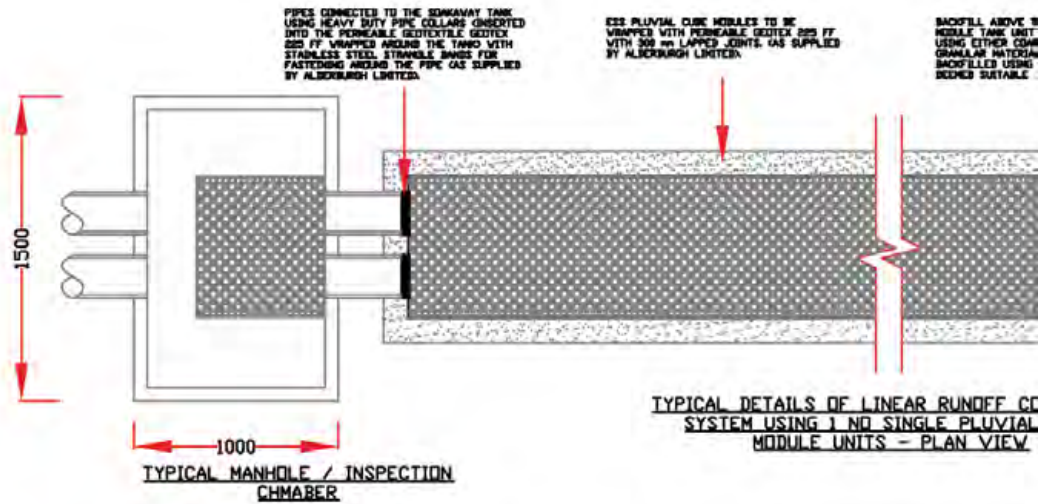
ESS 50 mm DRAINAGE CELL (1000 mm LONG x
1000 mm WIDE x 52 mm HIGH)
ARRANGEMENTS AS SHOWN

ESS PLUVIAL CUBE MODULE (500 mm LONG x
500 mm WIDE x 550 mm HIGH)
ARRANGEMENTS AS SHOWN. MODULES CAN BE
SECURED AS A 'HOUSE KEEPING' MEASURE
WITH PLASTIC PROPRIETY CABLE TIES.

ESS PLUVIAL CUBE MODULES TO BE
WRAPPED WITH PERMEABLE GEOTEX 225 g/m²
WITH 300 mm LAPPED JOINTS. GAS SUPPLIED
BY ALDERBURGH LIMITED.



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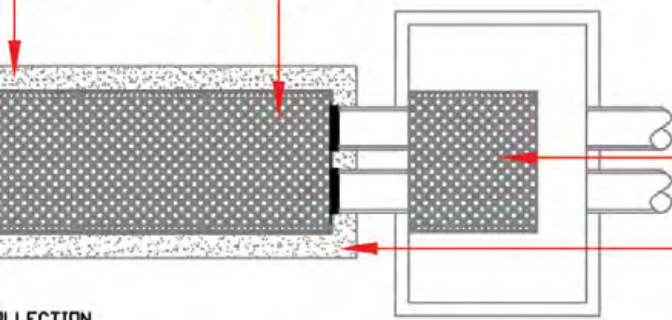


A 3 - 50 CBR HAS BEEN ASSIGNED AT SUB-BASE LEVEL SHOULD THE CBR BE TESTED AND FOUND TO BE LESS THAN 50 THEN THE ENGINEER SHALL BE NOTIFIED ALSO, ANY SOFT SPOTS FOUND AT SUB-BASE LEVEL SHALL BE REPORTED TO THE ENGINEER

Pluvial Cube

THE PLUVIAL CUBE FOR 100 mm THICKNESS OF SAND OR CLASS 6H GRANULAR MATERIAL TO BE BACKFILLED WITH CLASS 6H OR 6P GRANULAR MATERIAL, IN ACCORDANCE WITH MCHV VOLUME 1 OR SIMILARLY APPROVED SPECIFICATION

ESS PLUVIAL CUBE MODULE 600 mm LONG x 300 mm WIDE x 300 mm HIGH. ARRANGEMENTS AS SHOWN. MODULES CAN BE SECURED AS A 'HOUSE KEEPING' MEASURE WITH PLASTIC PROPERTY CABLE TIES.



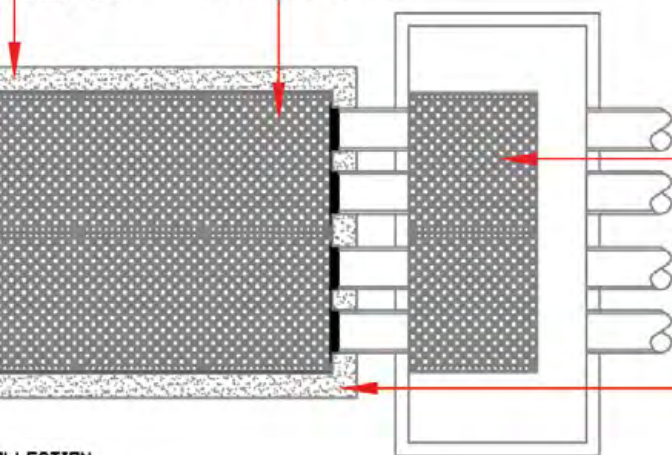
FILTER MODULE WRAPPED WITH GEOTEX 825 FILTER FABRIC CONNECTED TO THE INLET OF THE TANK

BACKFILL AROUND THE SIDES OF PLUVIAL CUBE MODULE FOR 100 mm THICKNESS USING COARSE SAND OR CLASS 6H SELECTED GRANULAR MATERIAL. REMAINING EXCAVATED AREAS TO BE BACKFILLED WITH CLASS 6H OR 6P GRANULAR MATERIAL IN ACCORDANCE WITH MCHV VOLUME 1 OR SIMILARLY APPROVED SPECIFICATION

TYPICAL MANHOLE / INSPECTION CHAMBER

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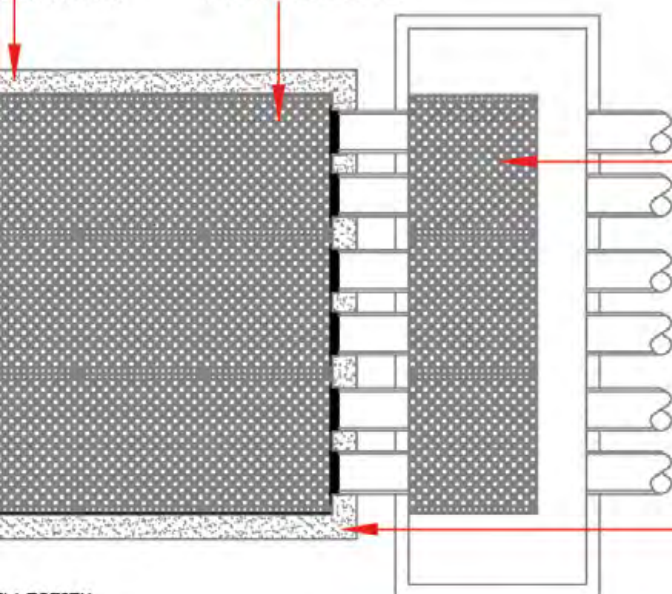
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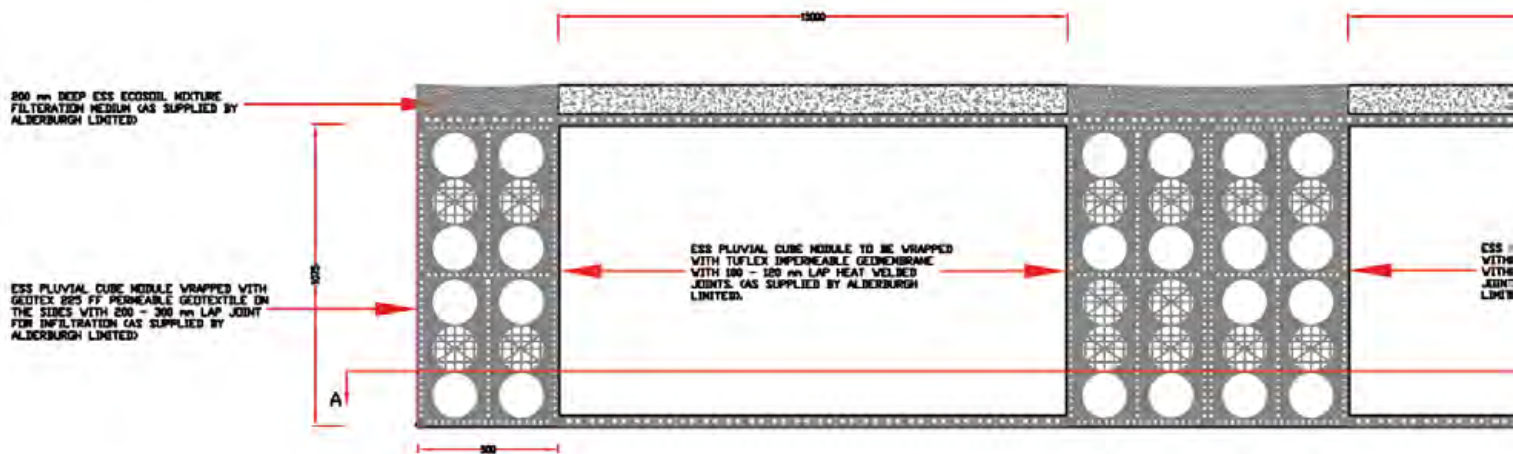


FILTER MODULE WRAPPED WITH GEOTEX 825 FILTER FABRIC CONNECTED TO THE INLET OF THE TANK

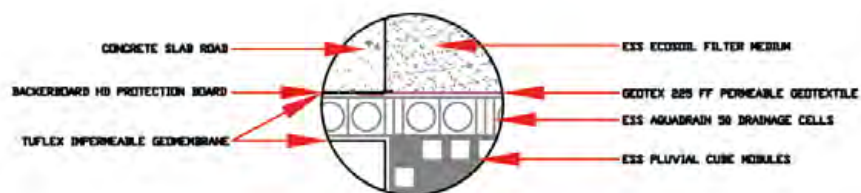
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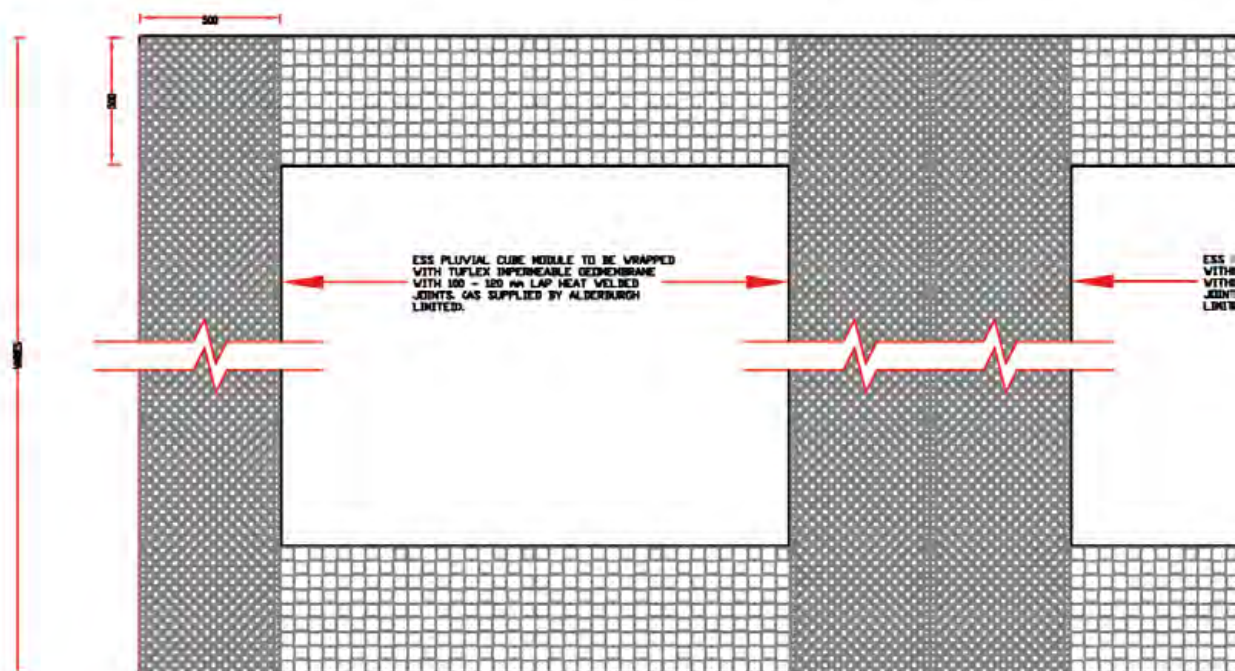




TYPICAL DETAILS OF ESS ROADSIDE DRAINAGE USING PLUVIAL CUBE MODULAR UNITS



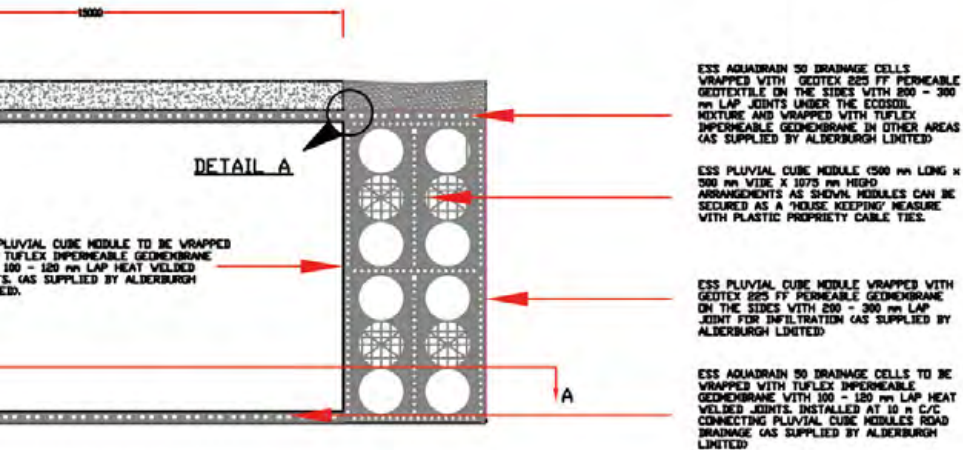
DETAIL A



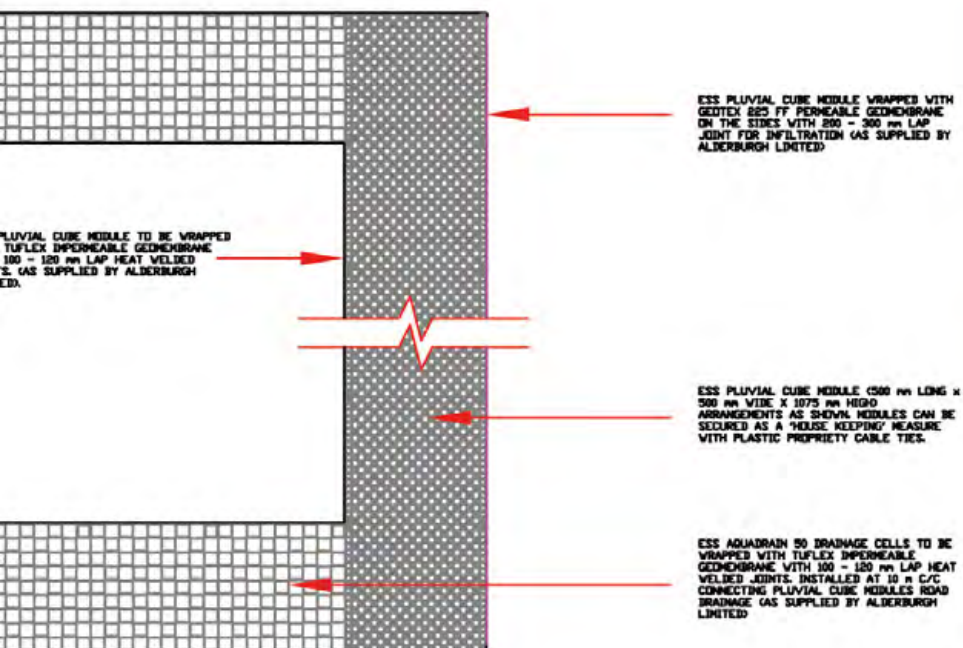
VIEW (A - A) OF ESS ROADSIDE DRAINAGE USING PLUVIAL CUBE MODULAR UNITS

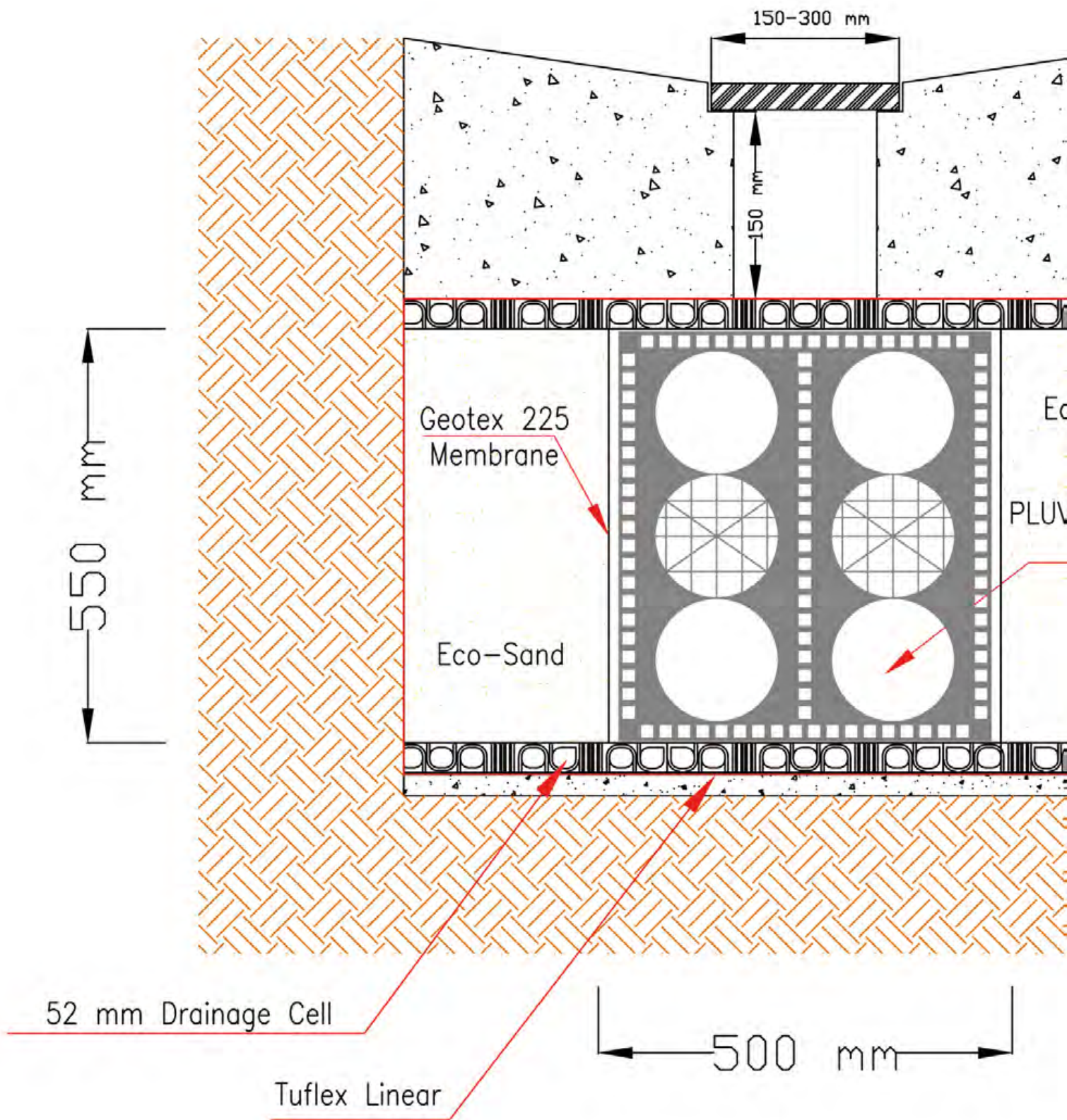
A 2 - 5% CBR HAS BEEN ASSUMED AT SUB-BASE LEVEL. SHOULD THE CBR BE TESTED AND FOUND TO BE LESS THAN 5% THEN THE ENGINEER SHALL BE NOTIFIED. ALSO, ANY SOFT SPOTS FOUND AT SUB-BASE LEVEL SHALL BE REPORTED TO THE ENGINEER.

Pluvial Cube

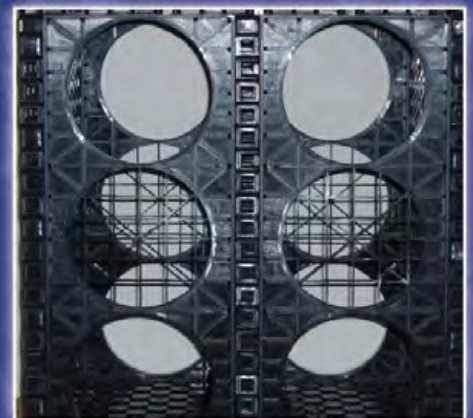


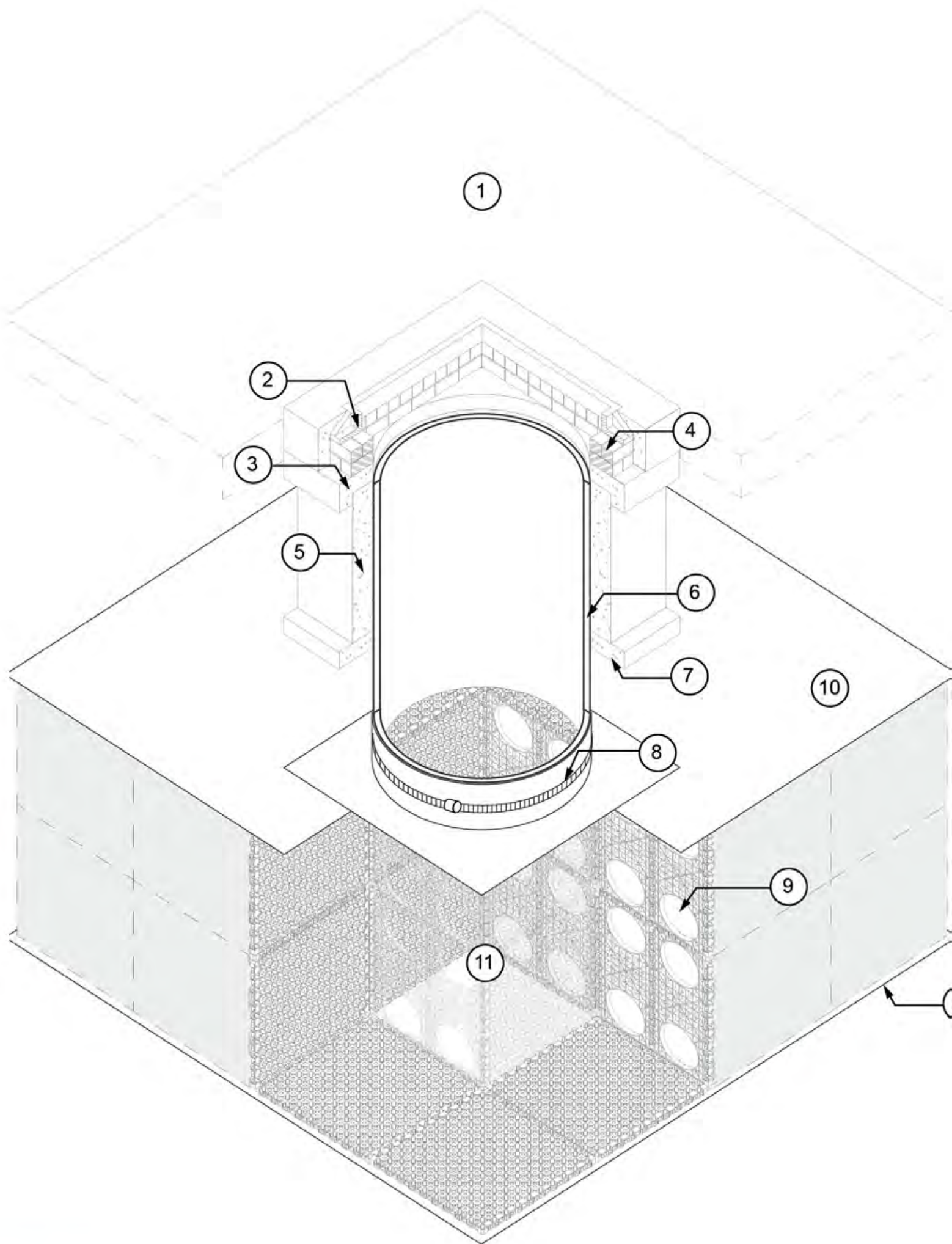
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Pluvial Cube





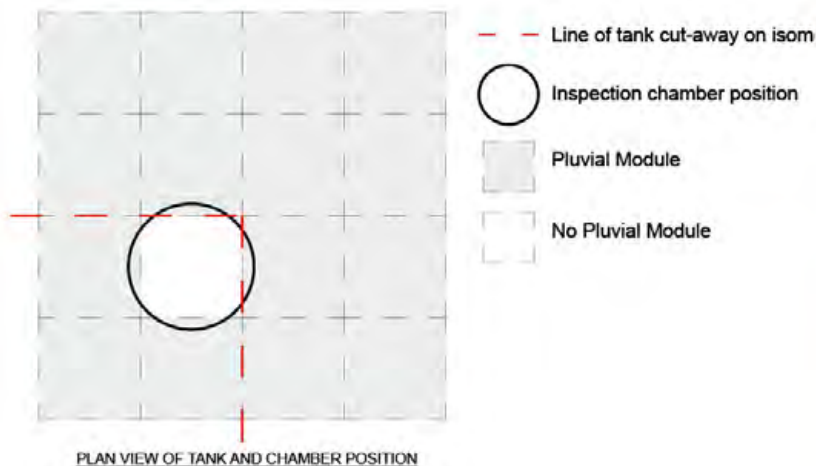
Pluvial Cube

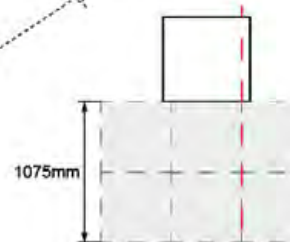
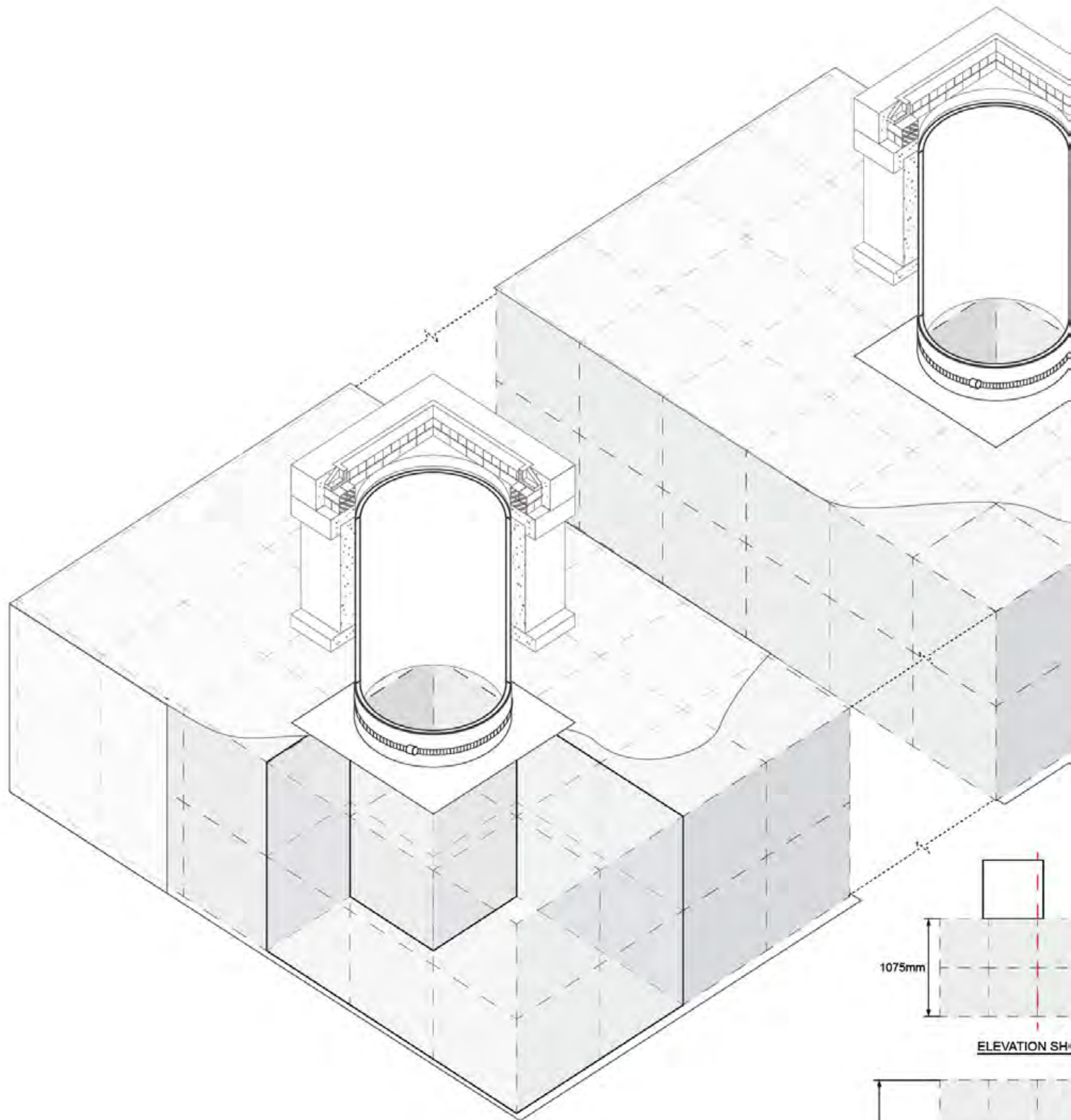
KEY:

- ① Finished Ground Level
- ② M.H. Cover and Frame bedded and haunched in 1:3 cement mortar
- ③ Reinforce Concrete Cover Slab bedded with mortar
- ④ Engineering or Special Purpose Concrete Brickwork: 4 courses max, 2 courses min and/or precast concrete cover frame seating rings
- ⑤ 150mm Concrete Surround (by others)
- ⑥ Inspection Pipe 600mm Ø connected to ESS Pluvial Modules for inspection/CCTV camera access and flushing if necessary. Inspection pipe sits along edge of surrounding Pluvial modules for initial support.
- ⑦ Reinforced concrete cover slab with mortar (by others)
- ⑧ Inspection Pipe connected to tank using Tuflex heavy duty pipe collars heat welded to Tuflex impermeable membrane and fastened to inspection pipe using stainless steel strangle bands
- ⑨ Pluvial Modules with clear 160mm access channels running along length of tank
- ⑩ Tuflex impermeable membrane heat welded at all joints and at junction with heavy duty pipe collar
- ⑪ 500 x 500mm clear vertical access beneath inspection chamber created by the removal of one Pluvial module on plan by the respective no. of modules deep (dependent on tank configuration).

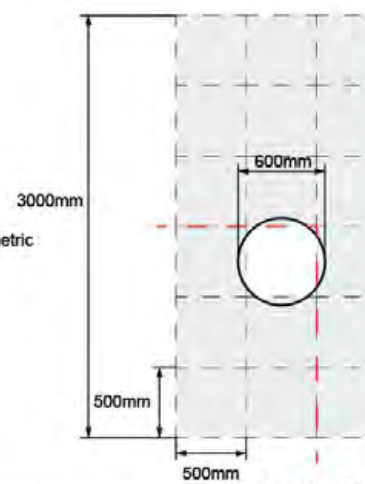
NOTE:

Geotex 300PP Protection Fleece not shown, but should be installed to cover the entire tank and protect Tuflex impermeable membrane from tears or punctures.





ELEVATION SH-



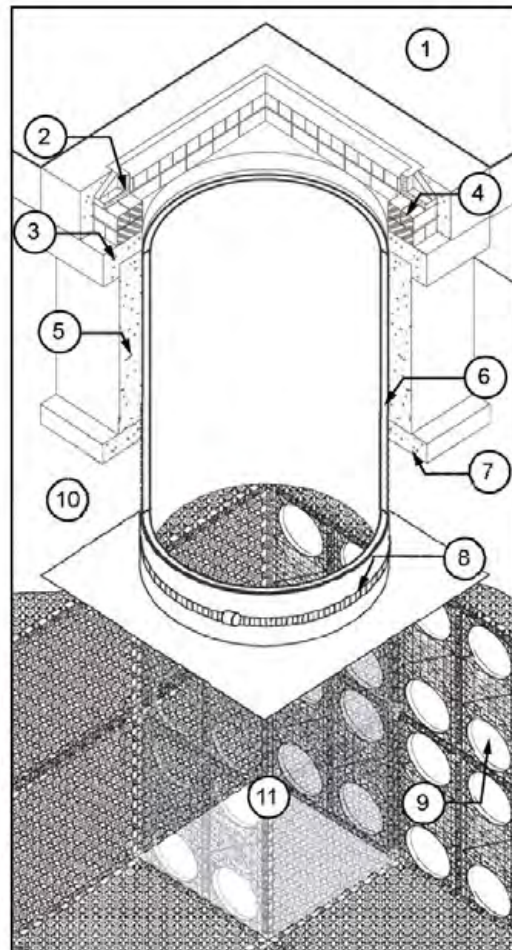
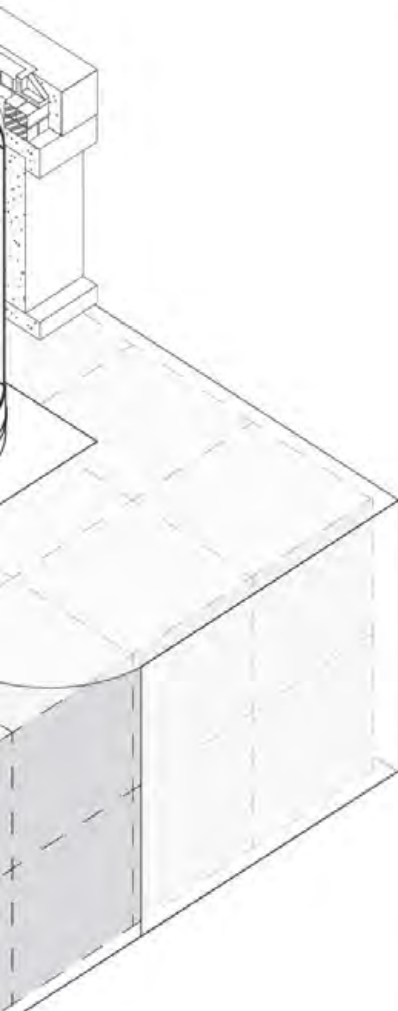
PLAN VIEW

- Line of tank cut-away on isometric
- ○ Inspection chamber position
- Pluvial Module
- No Pluvial Module

NOTE:

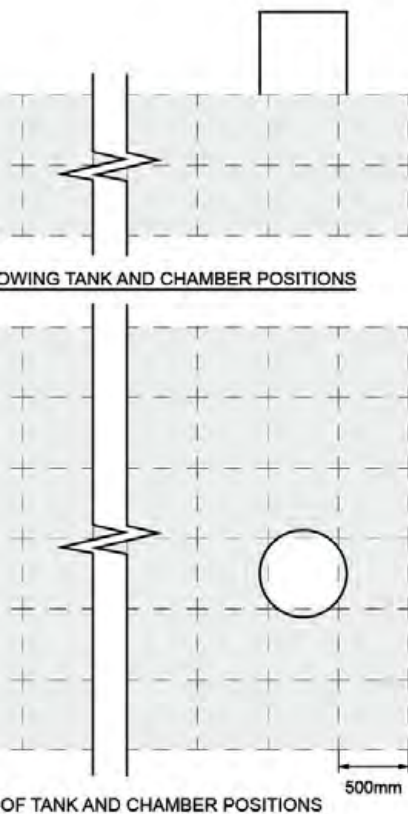
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Pluvial Cube



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Surface Water Flow Control Systems

ACO Q-Brake Vortex and ACO Q-Plate

Introduction to the ACO Group

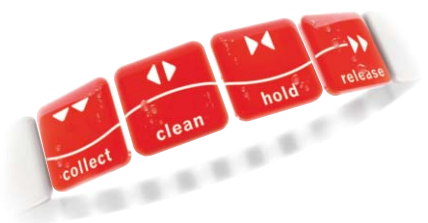
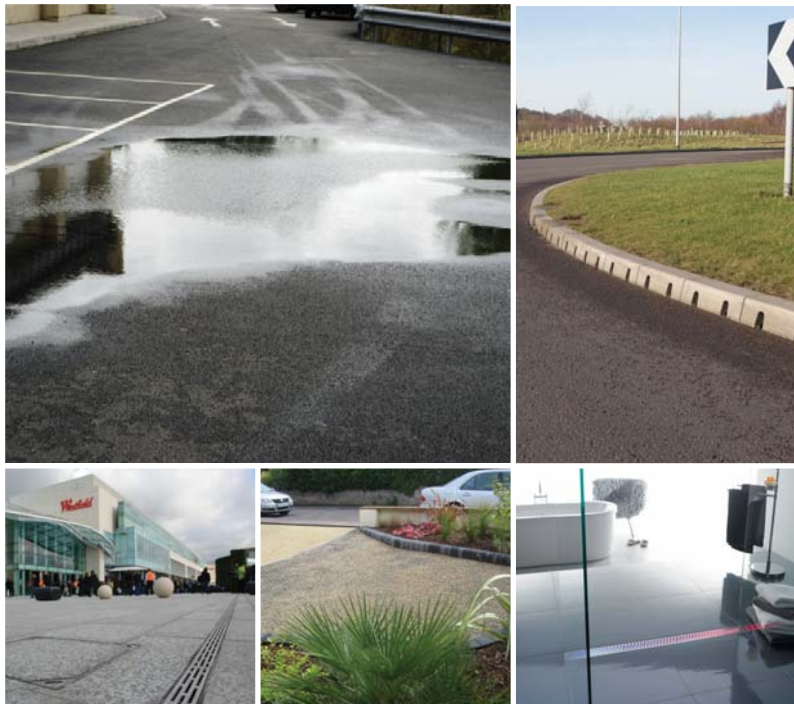
Throughout the world ACO branded drainage and surface water management systems are recognised for their innovative design, high quality manufacture, environmental excellence and industry leading performance.

Today the ACO Group has a research and production base that reaches across four continents. This unmatched resource pioneers the development of solutions that are tailored to individual applications, meeting the need for high performance, sustainable products that deliver optimum value throughout their operational life.

ACO Technologies plc

ACO operates as ACO Technologies plc in the United Kingdom. Founded over 25 years ago, the company has grown quickly on a reputation for design innovation and customer service.

There are 2 core divisions, ACO Water Management and ACO Building Drainage, that serve every sector of the construction industry, providing solutions for applications as diverse as rail, highways, airports, landscaping, retail, distribution centres and environmentally sensitive projects.



To help architects, designers and contractors meet the legal requirements that now tightly control the way surface water is managed, ACO has created its unique 'Surface Water Management Cycle' – Collect, Clean, Hold, Release – the four core processes now required for the complete and sustainable management of surface water drainage.



Contents

Introduction to ACO's surface water control systems	4
Benefits of using a surface water control system	6
ACO Q-Brake Vortex features overview	8
ACO Q-Brake Vortex specification and design process	10
ACO Q-Brake Vortex Installation detail	11
Operation and maintenance recommendations	12
Introduction to ACO Q Plate	14



Introduction to ACO's Surface Water Flow Control Systems

ACO's range of flow control systems are designed to regulate storm water flow before it discharges into the watercourse or sewer networks. ACO Q-Brake Vortex flow controls and ACO Q-Plate orifice plates are capable of regulating any flow for surface water applications and can be used in conjunction with retention and attenuation systems, such as ACO StormBrixx, as an integrated sustainable urban drainage (SuDS) scheme.

What is ACO Q-Brake Vortex?

ACO Q-Brake Vortex is a horizontal vortex flow control designed to regulate storm water flows from 1-100 litres per second. Manufactured from grade 304 stainless steel, each ACO Q-Brake Vortex is individually configured to suit specific performance criteria.

The design of a vortex flow control is based on the fluid mechanics principle of the forced vortex, which permits flow regulation without any moving parts.

ACO Q-Brake Vortex utilises the upstream head and discharge to generate a 'vortex' within the structure of the unit. The water is then released at a pre-determined controlled rate preventing downstream flooding.

Unlike more conventional methods, ACO Q-Brake Vortex is less prone to blockage, and permits higher flow at a lower head of water, as a vortex control allows an outlet 4-6 times larger in cross sectional area to be used.

ACO Q-Brake Vortex can form part of the design of any integrated drainage scheme for a wide range of infrastructure, industrial and other SuDS applications.

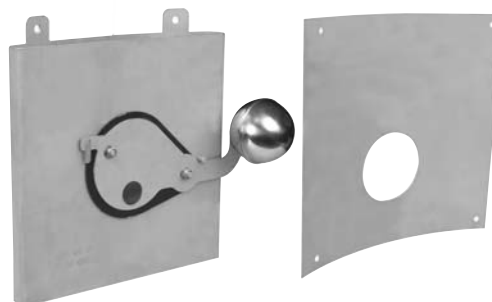


What is ACO Q-Plate?

ACO Q-Plate orifice plates are designed for use where an ACO Q-Brake vortex is not the most effective solution.

To suit application requirements, the range is available with or without remote bypass and drain down and is designed to match a variety of manhole configurations.

Information regarding the specification of ACO Q-Plates can be found on page 14.



ACO Q-Plates with and without draindown

Why choose ACO Q-Brake Vortex?



► Planning and connection

ACO Q-Brake Vortex addresses the planning and connection requirements set out in the Floods and Water Management Act. Where a discharge restriction is in place, ACO Q-Brake Vortex regulates the surface water flow to the specified rate.

► Tailored performance

Each ACO Q-Brake Vortex is tailored to the specific performance requirements of the application providing optimum efficiency within the system.

► Optimum hydraulic efficiency

The mechanism employed within ACO Q-Brake Vortex provides superior hydraulic performance in comparison to traditional flow control systems.

► Water Authority Approval

ACO Q-Brake Vortex has been approved for use by a number of water authorities including Severn Trent, Anglian and Scottish Water.

► Proven performance

ACO Q-Brake Vortex is UK manufactured and has been independently laboratory tested to verified discharge rates.

► Simplified access and maintenance

ACO Q-Brake Vortex has large clear openings making it less prone to blockage. The absence of any loose parts also reduces maintenance requirements.

The patented bypass door and emergency drain down facility allows ACO Q-Brake Vortex to be remotely accessed from the surface to allow the upstream system to be independently drained, completely bypassing the inlet. Building Regulations 2000 Section H discourages direct man access to sewer manholes.

► Reduces total installed cost

ACO Q-Brake Vortex allows more flow at lower heads, reducing the need for on-site storage volume requirements lowering installation costs.

► Ease of installation

Each ACO Q-Brake Vortex unit is custom built to suit the profile of the chamber. Radius fixing options remove the need for additional benching - simplifying installation and reducing cost.

► WinDes

ACO Q-Brake Vortex can be sized and modelled on the latest version of the design software and can be incorporated into the overall hydraulic drainage design.



Benefits of using a surface water flow control system

Storage and the controlled release of clean water into the natural environment is an important aspect of managing surface water in the SuDS approach. The Floods and Water Management Act now gives overall responsibility to the local regulatory body to impose, where appropriate, the discharge rate of a surface water flow control system.

ACO's range of flow control systems can be used in conjunction with ACO's award-winning attenuation and infiltration system, ACO StormBrixx, to provide a fully integrated storm water control system meeting the requirements of the regulations.

This diagram simulates how the ACO StormBrixx system is used to provide storm water attenuation, whilst the ACO Q-Brake Vortex is used to regulate the rate of discharge from the development into the watercourse or sewer network.

Compared to the use of traditional flow control systems, the combination of ACO StormBrixx and ACO Q-Brake Vortex can reduce the need for additional upstream storage lowering overall installation and maintenance costs.

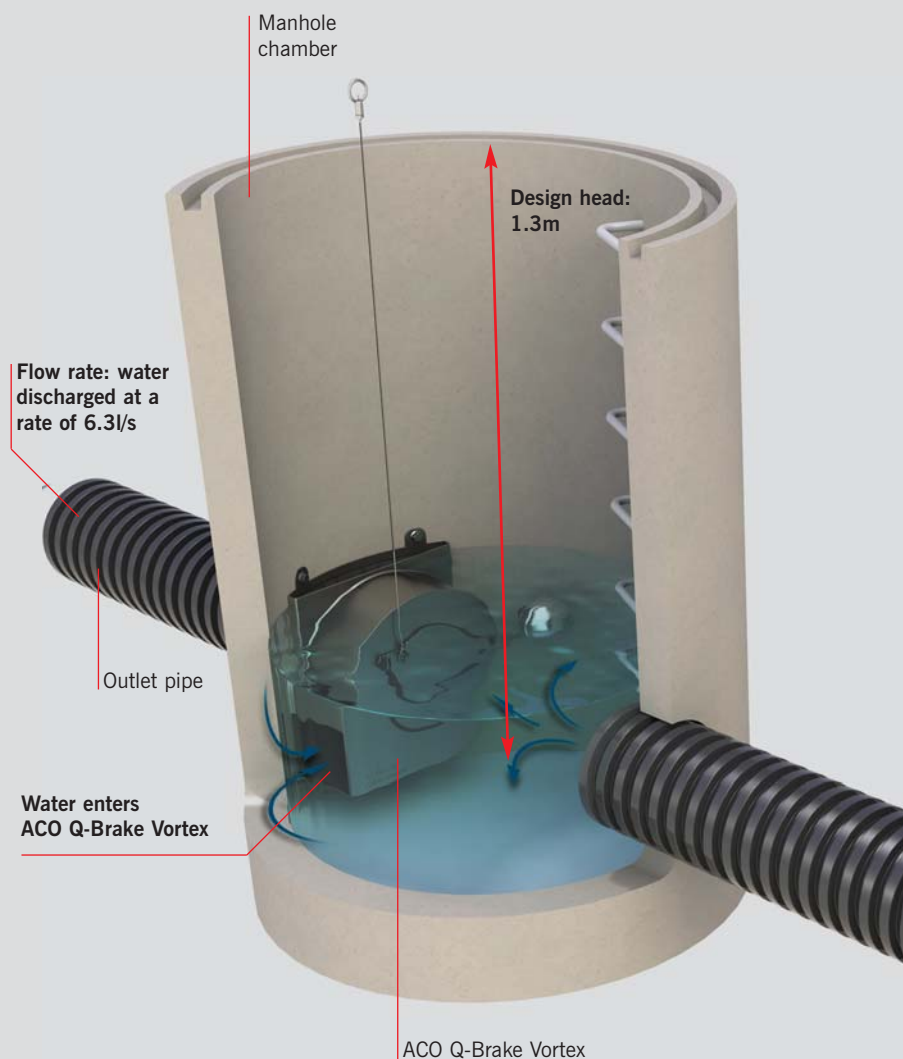
This benefit is best demonstrated in the example opposite. The conclusion of the example means that upstream storage can be reduced by 11m³ compared to using a traditional flow control system.



For more information on ACO's award winning attenuation and infiltration system, ACO StormBrixx, please go to www.stormbrixx.co.uk.

Example:

There is a project in Bedford, England with a catchment area of 13,000m². The project has design criteria of a 1 in 30 year storm and the runoff from the site must not exceed 6.3l/s at a design head of 1.3m.

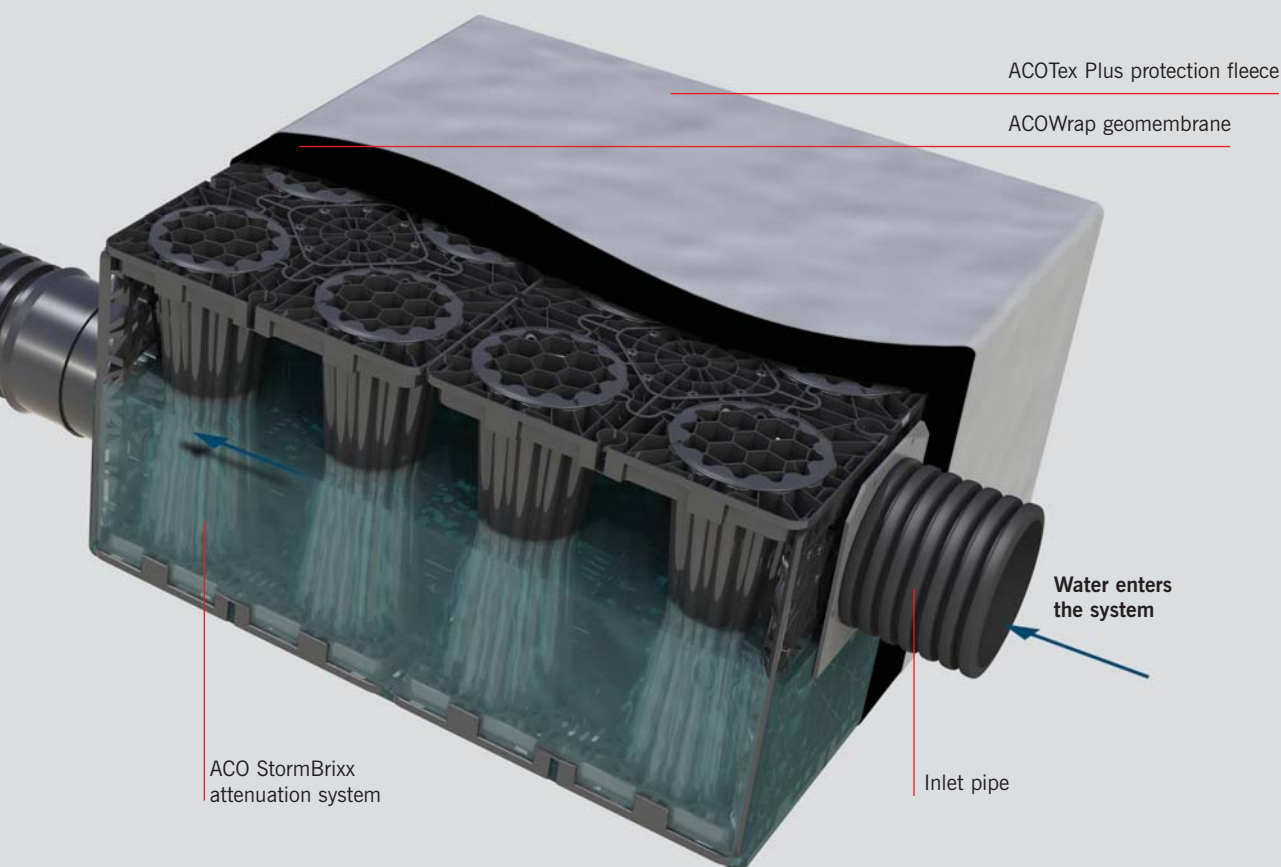
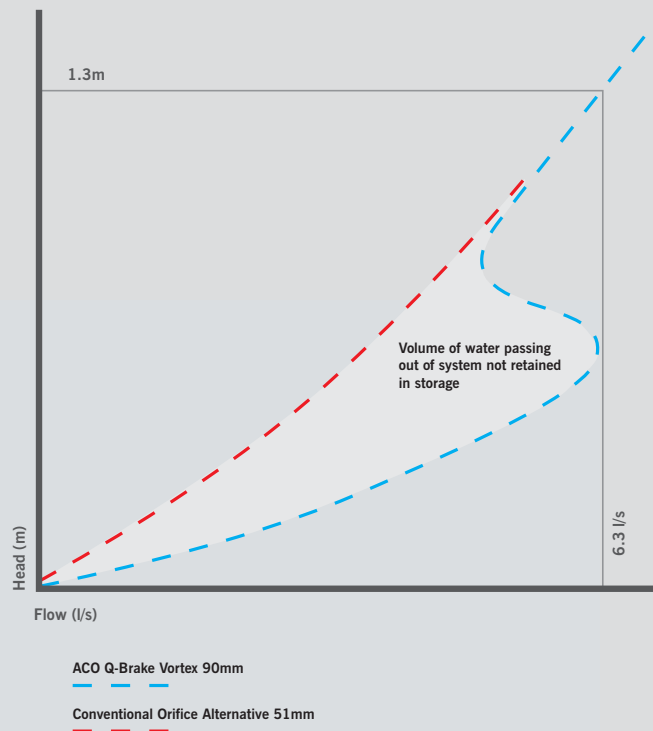


Results:

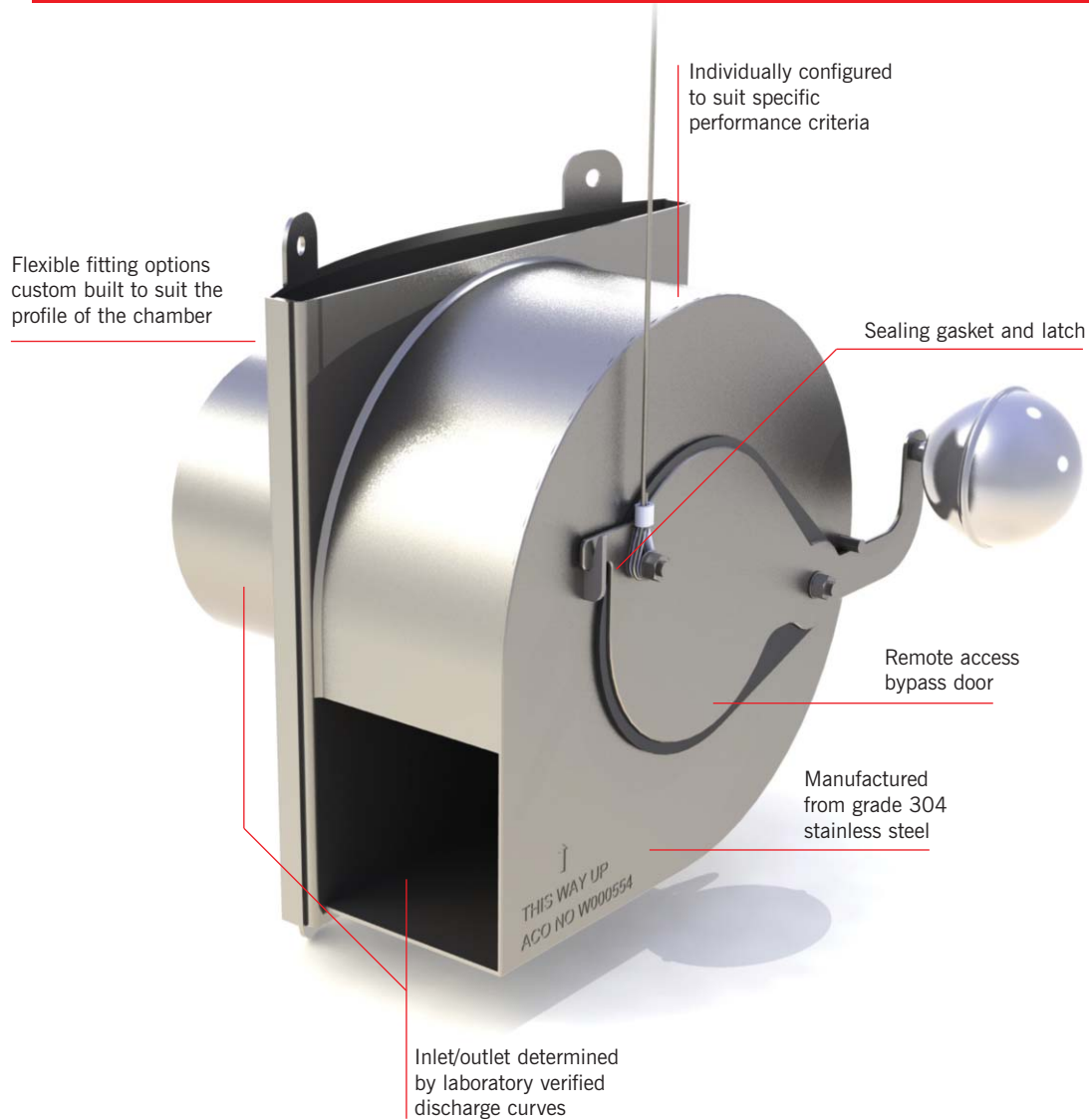
Using MicroDrainage® software, ACO has compared the upstream storage requirements using ACO Q-Brake Vortex and a traditional orifice plate. The results are summarised below:

- ▶ ACO Q-Brake Vortex required Ø90mm. Upstream attenuation required 402m³.
- ▶ Orifice plate size required Ø 51mm. Upstream attenuation required 413m³. ACO Q-Brake Vortex reduces upstream attenuation by 11m³ whilst having an orifice over three times the area of the traditional orifice plate and making ACO Q-Brake Vortex more efficient and far less prone to blockage.

Discharge characteristics

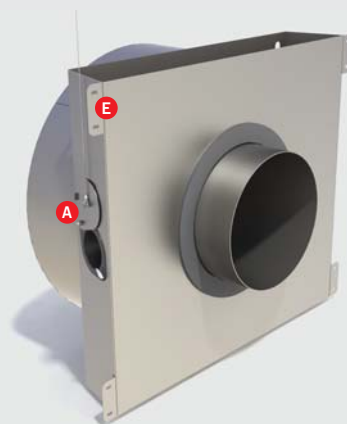


ACO Q-BRAKE FLOW CONTROL FEATURES OVERVIEW



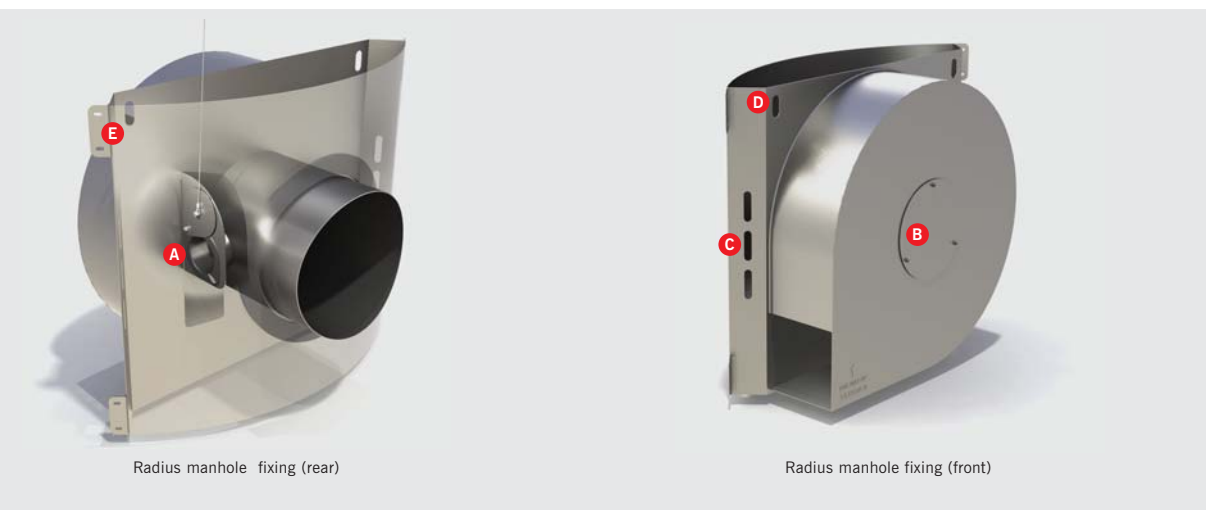
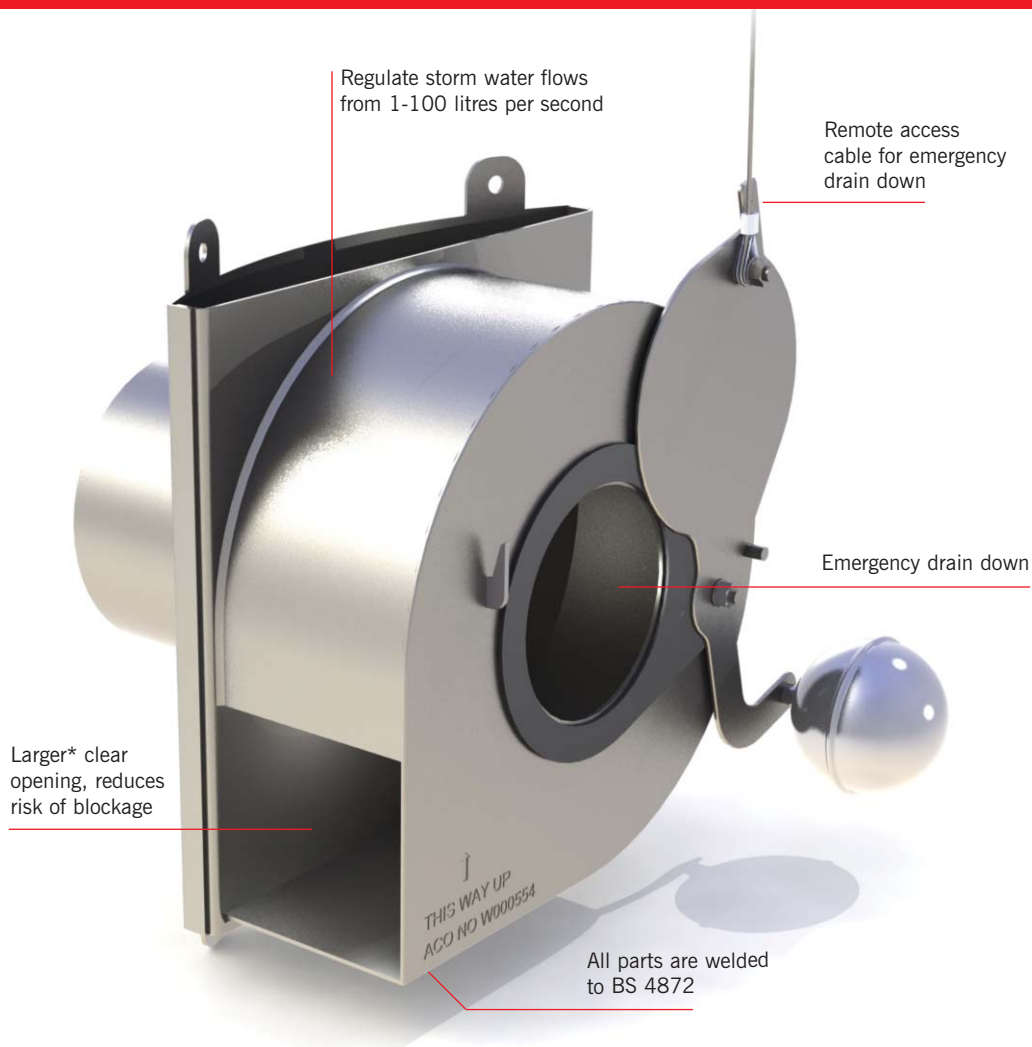
Additional and varying features for ACO Q-Brake Vortex >40l/s

- A** Remote access bypass door and emergency draindown. Located in a different position to ACO Q-Brake Vortex units <40l/s
- B** Removable maintenance cover
- C** Side vents to aid draindown on units with radius fixing
- D** Lifting eyes
- E** Fixing locators



Square manhole fixing (rear)

*Larger than traditional orifice plates



ACO Q-Brake Vortex specification and design process

Manufactured from grade 304 stainless steel, each ACO Q-Brake Vortex is individually configured to suit specific performance criteria. Our engineers will use industry standard drainage software and hydraulic design calculations to ensure the system is correctly sized for any project requirement.

In order to complete this process and deliver the product options available, please provide the ACO engineers with the following information:

- ▶ The proposed design flow – maximum allowable discharge
- ▶ The proposed design head – invert of outlet pipe to top water level
- ▶ The proposed outlet pipe diameter
- ▶ The proposed type and size of outlet manhole

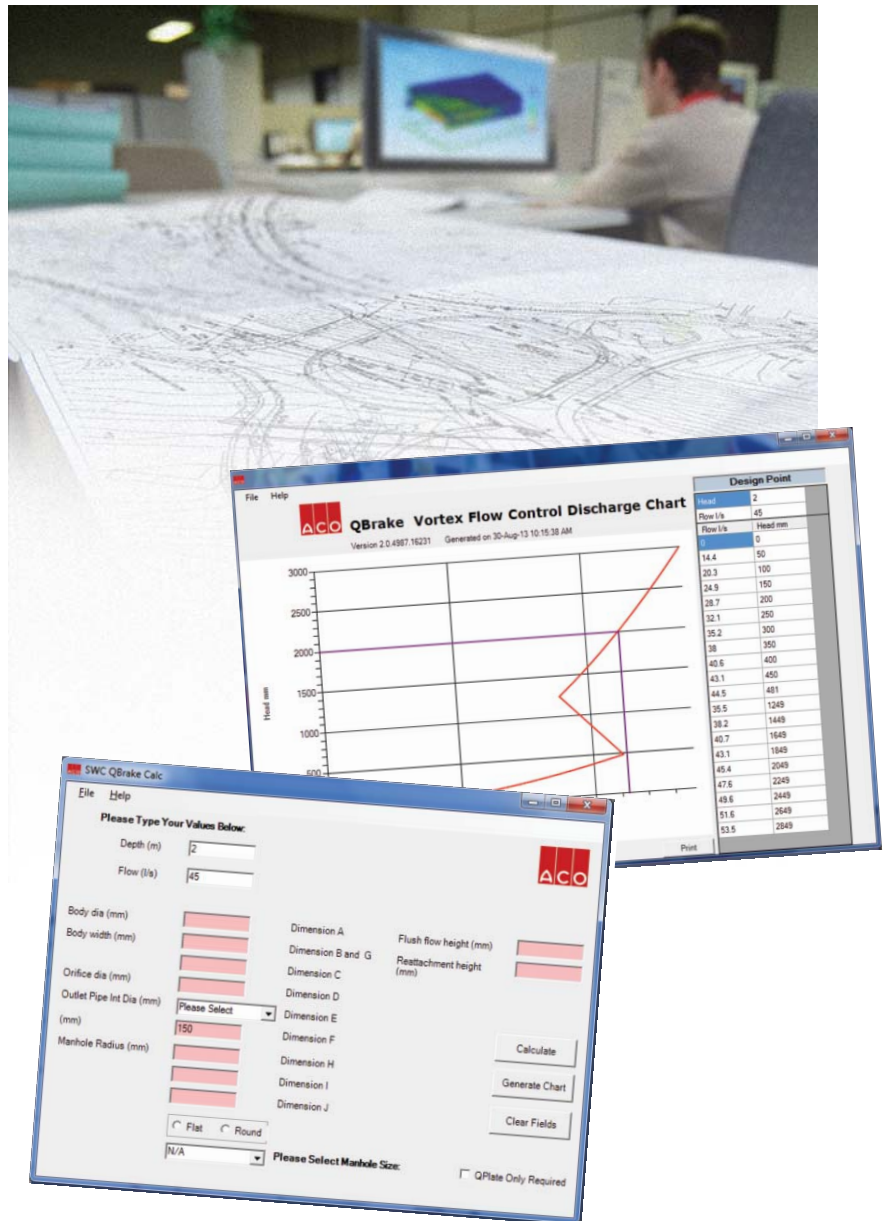
Before production can commence, ALL of the above information must be verified on ACO's Contract Review Document issued at the time of order placement.

Finished product

From this information ACO will size and design the ACO Q-Brake Vortex to meet the design criteria and to suit the proposed surface water application.

ACO will supply:

- ▶ Head discharge table & graph
- ▶ ACO Q-Brake Vortex installation details
- ▶ Information for manhole sizing



ACO Water Management Design Services Team

ACO has embraced the concept of 'value engineering' – a totally new approach to on-site construction that saves both time and money. ACO will review any design to minimise the total scheme and life cost of a proposal.

By utilising ACO's portfolio of products, it is often possible to remove the need for conventional underground drainage.

ACO Water Management
Design Services Team
Tel: 01462 816666
Email: technical@aco.co.uk

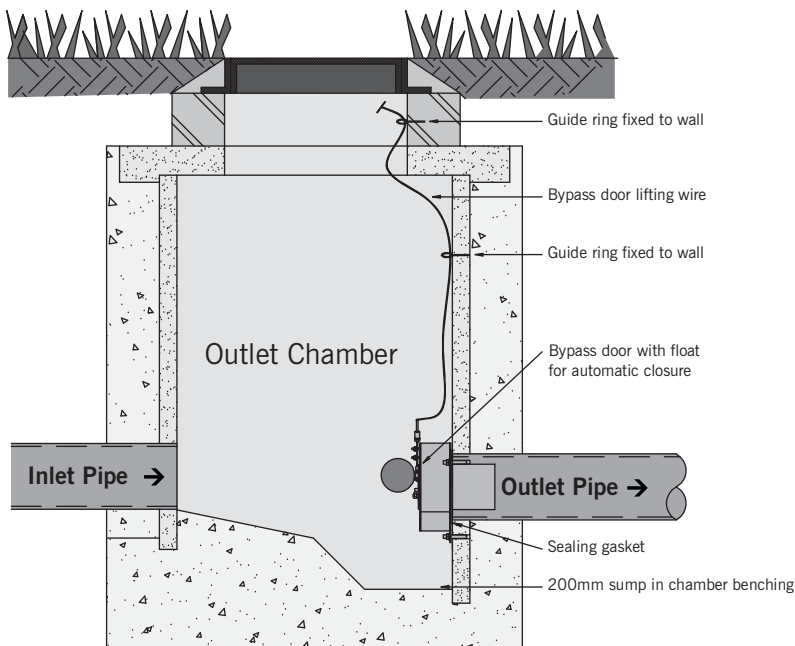


Micro Drainage Modelling

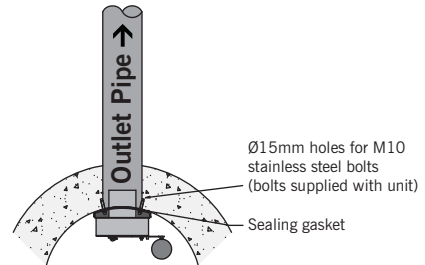
ACO Q-Brake Vortex can be sized and modelled on the latest version of Micro Drainage.



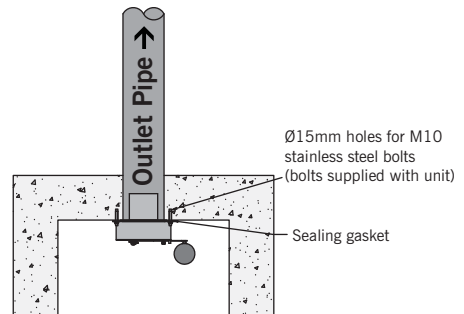
Installation detail



Fixing installation detail for round manhole chambers



Fixing installation detail for flat sided manhole chambers



Guide to installing ACO Q-Brake Vortex flow control regulator

Step 1:

Construct the chamber that is to house the ACO Q-Brake Vortex flow control. Note that if the chamber has a curved wall (e.g. a concrete ring manhole), the diameter of the chamber should be specified on the order and Contract Review Document for the ACO Q-Brake Vortex flow control unit.

Step 2:

The base of the chamber must be at a level 200mm below the bottom of the ACO Q-Brake Vortex flow control. When the chamber base is benched, there must be a 200mm deep sump below the bottom of the unit as shown on the sketch.

Step 3:

Offer the ACO Q-Brake Vortex flow control unit up to the outlet pipe using the lifting eyes where appropriate. Ensure the unit is upright (arrow pointing vertically up). Mark the position of the fixing holes on the chamber wall. Remove the unit and drill fixing holes to suit the M10 bolts supplied with the unit. (Note bolts are Rawlbolt R-XPT-S stainless steel M10 bolts requiring a hole 15mm diameter).

Step 4:

Place bolts into the drilled holes. Locate the ACO Q-Brake Vortex flow control onto the bolts (again check it is upright). Ensure that the gasket is flat against the wall. Fit the nuts and tighten them to pull the unit against the gasket and seal it against the wall.

Step 5:

Fix the two wire guide rings (supplied) to the chamber wall, one approx mid height and one just under the access cover. Thread the bypass door lifting wire through the rings. Adjust the length of the wire by fixing the handle in the correct position and cut to length if necessary.



An electronic version of the ACO Q-Brake Vortex installation detail is available to download from the ACO website. Visit www.aco.co.uk.

Operation and maintenance recommendations

Commissioning the product

Before the product is commissioned, the chamber containing the ACO Q-Brake Vortex should be inspected in line with normal practice. Any debris or silt should be removed. Any visible fixing bolts should be checked.

If an internal blockage is suspected, the control can be inspected internally and cleaned out by opening the inspection bypass door on the upstream end. The bypass door must be returned to the closed position before the control becomes operational or bolted shut.

Frequency of inspection / maintenance

Inspections should be carried out at frequent and regular intervals (approximately every 3-6 months). The frequency will depend upon the location and the environment, and should be based on local knowledge. Action is only required in the event of a blockage or suspected blockage.

Maintenance plan

ACO Q-Brake Vortex flow controls require no routine maintenance although inspections should be carried out at regular intervals (See frequency of inspection / maintenance section).

Manual handling

ACO Q-Brake Vortex flow controls should be handled in accordance with current legislation and regulations:

- The Health and Safety at Work Act 1974
- The Management of Health and Safety at Work Regulations 1999
- The Manual Handling Operations Regulations 1992

Service life

ACO Q-Brake Vortex flow controls have no moving parts to wear or fail. Manufactured from grade 304 stainless steel plate they will resist scour, degradation and chemical attack. The unit is designed to easily outlast the drainage system in which it is installed.

COSHH

ACO Q-Brake Vortex flow controls are manufactured from grade 304 stainless steel. This material is not regarded as hazardous to health and demonstrates no chemical hazard when used for the stated applications.

MODEL SPECIFICATION CLAUSE

The vortex flow control device shall be supplied by ACO Technologies plc; all materials and components within the scope of this system shall be obtained from this manufacturer.

All units shall be manufactured from grade 304 stainless steel incorporating rear mounted remote access bypass and emergency drain down door complete with stainless steel cable and fixings.

ACO Q-Brake Vortex is a vortex flow control device designed to suit a design head of #mm and design flow of # litres per second.

Insert information as appropriate

NBS Specification

ACO Q-Brake Vortex should be specified in section R12. Assistance in completing this clause can be found in the ACO Water Management entry in NBS Plus, or please contact the ACO Water Management Design Services Team.

Note: A specification in NBS format is available to download from www.thenbs.com or www.aco.co.uk

RECYCLED CONTENT

ACO Technologies aims to incorporate as much recycled material or waste material as is practicable in its manufactured products.



Typically steel products contain between 25% and 33% recycled content by weight. Therefore the total recycled content of the ACO Brake Vortex will contain be at minimum approximately 25% by weight recycled material.

ACO Q-Brake Vortex is intended for a long life with low maintenance, to reduce the need to recycle, but when eventually the product is no longer needed, much of its content can be readily recycled with a very low risk of pollution to the environment.



Product Testing

Through ACO's continual product development and refinement programme has led to an enhanced range of ACO Q-Brake Vortex flow controls. The range has been independently tested and complex software written to ensure that the best possible characteristics and curves are achieved to help reduce upstream storage requirements and installation costs.

What is ACO Q-Plate?

ACO Q-Plate orifice plates are designed for use where an ACO Q-Brake vortex is not the most effective solution. To suit application requirements, the range is available with or without remote bypass and drain down and is designed to match a variety of manhole configurations. A neoprene sealing gasket and fixing holes are featured on each unit.



ACO Q-Plate with remote draindown and bypass
recommended for all orifice apertures less than 100mm



ACO Q-Plate

ACO Q-Plate Bypass features

- ▶ Manufactured from 304 stainless steel
- ▶ Orifice aperture up to 150mm
- ▶ Sealing pipe gasket
- ▶ Emergency drain-down and access cable
- ▶ Bypass door (with improved seal) and latch
- ▶ Flat or curved radius to suit manhole diameter
- ▶ Manhole fixings

ACO Q-Plate features

- ▶ Manufactured from 304 stainless steel
- ▶ Four fixing positions
- ▶ Pipe sealing gasket
- ▶ Manhole fixings
- ▶ Flat or curved radius to suit manhole diameter

ACO Q-Plate Specification and design process

To suit project requirements, two options of ACO Q-plate are available:

ACO Q-Plate Bypass

< 100mm orifice with remote drain-down and bypass (also available up to 150mm)

ACO Q-Plate

> 100mm orifice without remote drain-down and bypass

In order to complete this process and deliver the product options available, please provide the ACO engineers with the following information:

- ▶ The proposed design flow – maximum allowable discharge
- ▶ The proposed design head – invert of outlet pipe to top water level
- ▶ The proposed outlet pipe diameter
- ▶ The proposed type and size of outlet manhole

Before production can commence, ALL of the above information must be verified on ACO's Contract Review Document issued at the time of order placement.

Finished product

From this information ACO will size and design the ACO Q-Plate to meet the design criteria and to suit the proposed surface water application.

ACO will supply:

- ▶ Head discharge table & graph
- ▶ ACO Q-Plate installation details
- ▶ Information for manhole sizing

Guide to installing an ACO Q-Plate

Step 1:

Construct the chamber that is to house the ACO Q-Plate orifice control. Note that if the chamber has a curved wall (e.g. a concrete ring manhole), the diameter of the chamber should be specified on the order and Contract Review Document for the ACO Q-Plate Orifice control unit.

Step 2:

There should be a small sump under the outlet to ensure the orifice control does not easily block, ideally there should be upstream sediment and debris traps. When the chamber base is benched, there should be a minimum 200mm deep sump below the bottom of the unit as shown on the sketch.

Step 3:

Offer the ACO Q-Plate orifice control unit up to the outlet pipe. Ensure the unit is upright (arrow pointing vertically up) and that the orifice is correctly positioned at the invert of the outlet pipe.

Check there is a good seal between the orifice plate and the outlet pipe. Mark the position of the fixing holes on the chamber wall. Remove the unit and drill fixing holes to suit the bolts supplied with the unit.

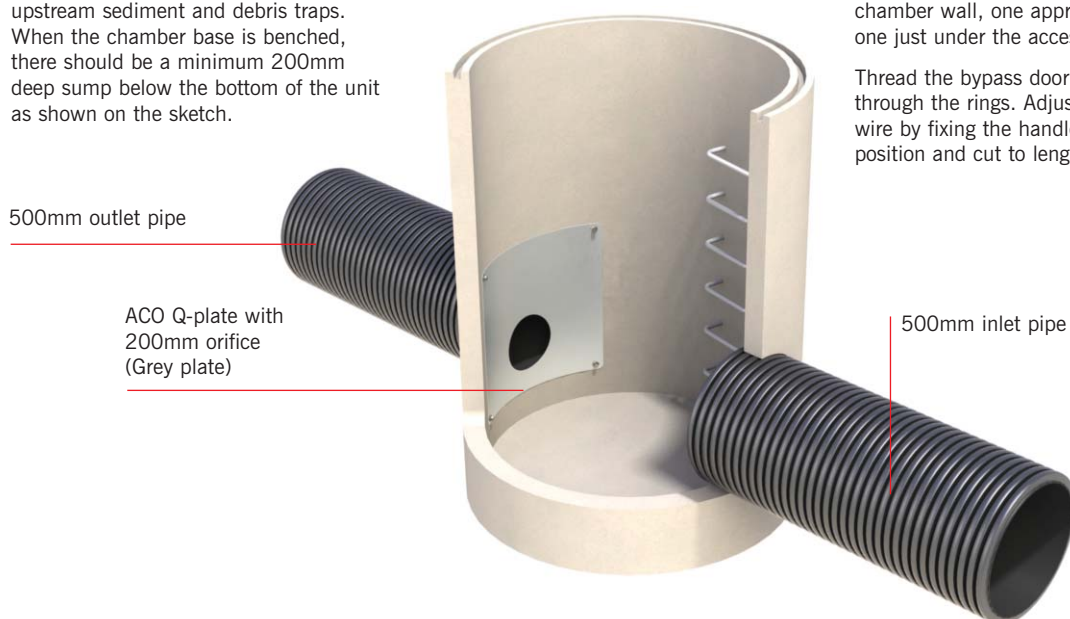
Step 4:

Place bolts into the drilled holes. Locate the ACO Q-Plate orifice control onto the bolts (again check it is correctly aligned). Ensure that the gasket is flat against the wall. Fit the nuts and tighten them to pull the unit against the gasket and seal it against the wall.

Step 5:

If you have been supplied the Q-Plate with the drain down and bypass door fix the two wire guide rings (supplied) to the chamber wall, one approx mid height and one just under the access cover.

Thread the bypass door lifting wire through the rings. Adjust the length of the wire by fixing the handle in the correct position and cut to length if necessary.



Model specification

ACO Q-Plate orifice control *with remote drain down and bypass (delete as appropriate), ##mm orifice designed to suit a pipe outlet size of ###mm, a design head of ## mm and design flow of # litres per second.

#insert information as appropriate.

ACO Technologies plc

- ACO Water Management
Civils + Infrastructure
Urban + Landscape
- ACO Building Drainage
- ACO Sport
- ACO Wildlife

ACO Water Management: Civils + Infrastructure

A division of ACO Technologies plc
ACO Business Park,
Hitchin Road, Shefford,
Bedfordshire SG17 5TE

Tel: 01462 816666
Fax: 01462 815895

e-mail Sales: customersupport@aco.co.uk
e-mail Technical: technical@aco.co.uk
website: www.aco.co.uk

The ACO Group: A strong family you can depend on.

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ACO CARES ABOUT THE ENVIRONMENT

Printed on material approved by the Forest Stewardship Council (FSC) who provide a means of assuring that products come from responsibly managed forest.



ISO 9001
FM 13502



ISO 14001
EMS 538781



OHSAS 18001
OHS 524145



011259
NSFA020 – NSFA065 Full Retention Separators
Installation & Maintenance Guidelines



Kingspan Environmental Service Contact Numbers:

GB: 0844 846 0500

NI: 028 3025 4077

IRL: 048 3025 4077

Enclosed Documents

DS0911P	NSFA020 – NSFA065 Full Retention Separators Sales Drawing
DS0859P	Neck & Coalescer Extension Details
PD0323	Oil Probe Fitting Details

Issue	Description	Date
04	CC1425 – Class 2 References Deleted	April 2018

HEALTH & SAFETY

These warnings are provided in the interest of safety. You must read them carefully before installing or using the equipment.

It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can be acquainted with the functioning of the equipment and the relevant warnings.

Installation should only be carried out by a suitably experienced contractor, following these guidelines.

We recommend the use of a dust mask and gloves when cutting GRP components.

Electrical work should be carried out by a qualified electrician.

Contaminated surface water can contain substances harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

Access covers should be selected with reference to the location of the unit and traffic loads to be accommodated. These are not (normally) part of the Separator supply.

When covers are removed precautions must be taken against personnel falling into the unit.

Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures.

Ensure that you are familiar with the safe working areas and accesses. Ensure that the working area is adequately lit.

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges.

OIL ALARM SYSTEMS

PPG3 recommends that the oil level alarm be fitted, tested and commissioned by a competent Installer. This is to ensure that the oil probe is calibrated correctly, raising an alarm when 90% of the oil storage volume is reached. Should the oil level alarm fail to provide an early warning, excessive oil could pass through the separator, thus polluting the environment. This could result in substantial cleanup costs and legal action being taken under the water resources act 1991.

MAINTENANCE

The correct ongoing maintenance is essential for the proper operation of the equipment. Operators who rely on oil level alarms to prompt them to service separators between maintenance intervals run the risk of polluting, should the alarms not work, hence the ongoing functional assessment of the oil alarm systems is fundamental if pollution incidents are to be avoided.

The removal of sediment and retained oil/grease should be carried out by a contractor holding the relevant permits to transport and dispose of such waste. The contractor must refer to the guidelines in this document.



**Kingspan Environmental
College Road North
Aston Clinton
Aylesbury
Buckinghamshire
HP22 5EW**

10

EN 858 : Separator systems for light liquids

GRP Glass Reinforced Plastic Tank

Full Retention Separators NS003 - NS200

Class 1 & 2

Watertightness	Passed
Structural Testing	Passed
Hydraulic efficiency	Passed

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Appendices

Separator Maintenance Log

1.0 Introduction

These Guidelines represent Best Practice for the installation of the above Full Retention Separator Units. Many years of specialist experience has led to the successful installation of thousands of separator units. It must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, a qualified specialist (e.g. Civil engineering consultant) must verify any information or advice given by employees or agents of the company regarding the design of an installation.

For guidance of Separator selection and application, please refer to the most recent issue of Environment Agency Guidelines No.3 (PPG3) and BS EN 858. Our Units have been independently tested by BSI and are certified as meeting the standards.

2.0 Handling & Storage

- 2.1. Care must be taken to ensure that units are not damaged during delivery and handling on site. Please take care and place unit so that it can not fall and become damaged.
- 2.2. The design requirements of our products will frequently mean that the centre of gravity of the unit is "offset". Care must therefore be taken to ensure that the unit is stable when lifting. Rainwater may also collect inside units, particularly if they have been stored on site prior to installation, adding weight and increasing instability. Check units before lifting and pump out any excess water.
- 2.3. When lifting units, use webbing slings of a suitable specification. Do not use chains.
- 2.4. A suitable spreader bar should be used to ensure that units are stable and that loads are evenly distributed during lifting. When lifting separators, a spreader bar should be used where the slings would otherwise be at an angle > 30 degrees to the vertical.
- 2.5. Lifting equipment should be selected by taking into account the unit weight, length and the distance of lift required on site.
- 2.6. We accept no responsibility for the selection of lifting equipment.
- 2.7. Whenever our units are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects, which may damage the unit. The units must be placed on ground, which is flat and level to evenly support the base of the unit. Do not roll separators.

3.0 Site Planning

The following points should be considered before installation of the equipment:

- 3.1. The discharge must have the consent of the relevant Environmental Regulator.
- 3.2. The installation should have Planning and Building Control approval.
- 3.3. Consider installing flow cut-off valves to isolate the separator in an emergency or during site cleaning operations. See Environment Agency Guidelines PPG3.
- 3.4. We will fit a tube to receive the alarm probe. This tube provides protection and ensures that the probe is positioned at the correct level to sense the oil build up. The tube design and probe level setting assumes the use of our standard oil alarm system and may not be suitable for other alarm supplier's equipment. The probe tube may be fitted either within the neck or within the body of the unit. It should be extended to ground level when fitted in the body of the tank and you should make provision to extend the tube to the required height before backfilling. Consult the alarm supplier's instructions for their detailed fitting installation instructions.
- 3.5. Consider venting of the unit. Comply with local regulations. In the UK, comply with the following regulations, for Petrol Stations: Health and Safety Guidance Note 41 (HS(G)41), for other applications: BS8301: 1985 (obsolescent) BS EN 752 Building Drainage. Adequate ventilation should be provided to the separator. The ventilation pipe should be as short as is practicable and be terminated not less than 2.5m above paving nor less than 1m above the head of an openable window or other opening into a building within a horizontal distance of 3m. Each neck should be vented independently, we advise against joining these below ground prior to their rising as vent stacks.
- 3.6. Uncontaminated run off such as roof water should be excluded from separators. (EA Guidelines PPG3.)

- 3.7. Consider installation of a sampling point downstream of the separator as there is no suitable facility to effectively sample the waste water from inside the unit. (Suggested in EN 858 Pt 1).
- 3.8. Ground conditions and water table level should be assessed. If the water table will be above the base of the units at any time of the year, adequate concrete backfill must be provided to avoid flotation. In poorly draining ground, consideration should also be given to the likelihood of flotation due to surface water collecting in the backfill, and an appropriate installation method devised to avoid this.
- 3.9. If the discharge is to a soakaway, a porosity test should be carried out as part of the assessment of suitability for sub-soil drainage.
- 3.10. The separator must be installed at a level that will allow connection to the incoming drain and a free discharge at the system outlet.
- 3.11. Do not install the unit deeper than necessary, if required, ensure that you purchase extension necks and coalescer extension chains. The minimum invert depth of the unit is shown on the customer drawing.
- 3.12. Adequate access must be provided for routine maintenance. Vehicles should not be permitted within a distance equal to the depth of the unit, unless suitable structural protection is provided to the installation.
- 3.13. There must be at least 1 metre of clear, level ground all around the access covers to allow for routine maintenance.
- 3.14. It is essential that a mains water supply is accessible for routine cleansing and refilling after removal of waste material and liquid.
- 3.15. Provide electrical supply for alarm system.
- 3.16. Installation should only be carried out by suitably qualified and experienced contractors in accordance with current Health and Safety Regulations. Electrical work should be carried out by a qualified electrician, working to the latest edition of IEE wiring regulations.
- 3.17. This unit is designed to operate with gravity in and out flows. The unit is not designed to operate with a pumped influent.

4.0 Installation – General

- 4.1. When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipework should be designed to minimise the risk of damage from differential movement of the unit(s) and/or surrounding material.
- 4.2. For separators with burial depths greater than 1000mm from cover level to the top of the unit, specific site conditions should be taken into consideration and the backfill designed to bear any loads which may be applied during and after installation to prevent the tank being subjected to these loads.
- 4.3. The excavation must be deep enough to provide bedding and cover depth as determined by the type of surface pavement and loading. Asphalt and concrete pads should extend a minimum of 300mm horizontally beyond the unit in all directions.
- 4.4. In situations where the excavation will not maintain a vertical wall, it will be necessary to shore up the side walls of the excavation with suitable trench sheets and bracing systems to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until the backfilling is complete, but before the concrete fully hardens.
- 4.5. In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be dewatered using suitable pumping equipment and this should continue until the installation is complete.
- 4.6. During installation care must be taken to ensure that the body of any unit is uniformly supported so that point loads through the unit are avoided.
- 4.7. The Concrete Specification is not a site specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES: C25 /30 C25 /30 C16 /20		REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30	270 - 280 Kg/M ³
	C20	220 - 230 Kg/M ³
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

5.0 Separator Installation

- 5.1. Excavate a hole of sufficient length and width to accommodate the tank and a minimum 300mm concrete surround and to a depth that allows for the burial depth of the unit plus concrete base slab.
- 5.2. Construct a suitable concrete base slab appropriate to site conditions. Ensure that the slab is flat and level.
- 5.3. When the concrete base slab has set enough to support the installed load, add a concrete haunch so as to provide even support under the unit, and then lower the unit onto the haunch using suitable webbing slings and lifting equipment.
- 5.4. Locate the float valve in the coalescer unit(s). Lift float valve and secure in the open position before filling and release when full. If the valve is not lifted during filling, it may "seat". The valve is fitted with cord to aid lifting. Add cord if extending the invert and fasten end to a convenient point.
- 5.5. **Pour no more than 300mm depth of clean water into the unit, avoiding shock loads. For units with more than one chamber, add water to each chamber simultaneously. DO NOT OVERFILL, the unit is not designed to hold water whilst unsupported. FILL THROUGH OUTLET AS WELL AS INLET.**
- 5.6. **Place concrete backfill to approximately 300mm depth under and to the sides of the tank ensuring good compaction to remove voids. DO NOT use vibrating pokers. Continue adding concrete backfill, simultaneously keeping the internal water level no more than 200mm above the backfill level at all times, until the backfill is just below the underside of the outlet drain, giving sufficient room to connect the inlet and outlet pipework.**
- 5.7. Connect inlet and outlet drains and vent pipes when safe access to the backfill can be gained.

PIPEWORK CONNECTIONS

In all cases, ensure that the outlet pipework level is maintained for correct operation. (Unless specified on the order, the fall across the unit will be as per the customer drawings). Small units are generally fitted with **PVCu spigots** to both the outlet and the inlet. Connect using the same size PVCu socket or a suitable reducer. Larger units are generally fitted with our own **GRP** manufactured sockets. The connecting pipework should be pushed into the socket and a joint made to fill in the gap using rope/hemp with a cement mortar or bonding mix. Ensure that the seal is secure and watertight before backfilling the pipe. Alternatively, proprietary **flex seal couplings** can be obtained to fit over the outside of the site pipework and the outside of the GRP socket. When using this connection method, please be aware that the outside GRP laminate is not perfectly regular and that you may need to use a sealant on the outside diameter of the GRP. Take care not to over tighten the coupling when connecting to the GRP and ensure that the seal is secure before backfilling the pipe. Drawing DS0185 provides the ID of our GRP sockets. The OD is variable, as the wall thickness can be up to 15-20 mm. If purchasing a flex seal coupling for use with clay/concrete, we suggest that a size 110 mm larger than the ID is selected.

5.8. Oil Level Alarm Neck fitting

We will fit a tube to receive the oil alarm probe. This provides protection and ensures that the probe is positioned at the correct level to sense oil build up. See alarm supplier information and ensure that the probe is placed within the tube and can be accessed from ground level.

Continue backfilling with concrete over the tank body to the required level. Build up a shell of concrete, minimum 225mm thick, around the access shaft(s). Temporarily strut the access shaft to avoid distortion.

- 5.9. Where we supply an extension shaft to meet a deeper invert requirement, a coalescer extension chain is also provided when needed. Remove the coalescer from the unit before adding the extension shaft(s). It is advisable to seal the joints on the extension shafts (particularly on sites with high ground water) with proprietary sealant or by GRP lamination (if skilled operatives are available). Temporarily strut the extension neck(s) to avoid distortion during back filling. Where more than one neck section is required to suit a deep invert, consider back-filling section by section. If the extension neck is too long, it can be trimmed using a fine-toothed saw. The original fixing hole bolting the coalescer to the neck should be sealed. Ensure that the vent socket if cut out, is replaced elsewhere. The maximum recommended inlet invert is 2000mm (using 500mm long extension sections). If you are installing a unit deeper than this then you must make your own arrangements for removing and replacing the coalescer. Consideration must be given to the depth of lift involved.
- 5.10. If extending the neck, remember to add a suitable length of cord to enable the float valve to be lifted when the unit is emptied. If the valve is not raised during filling then the float valve may stick at the base.
- 5.11. Coalescer. When refitting, ensure that the core tube is correctly seated onto the base fitting.
- 5.12. Continue back-filling, ensuring minimum 225mm concrete thickness around the access shaft/extension neck and alarm access tube (as applicable).
- 5.13. Mains powered alarm Systems. See alarm suppliers installation instructions. Lay 82mm diameter PVCu underground ducting between the alarm panel location and the alarm probe position. The ducting should be 500mm below ground level and fitted with a drawstring for later cable insertion. Any changes of direction should be by long radius bend. If necessary, drill a suitable hole in the access shaft adjacent to the alarm probe terminal box, to accept the ducting and seal.
- 5.14. In traffic areas a suitable top slab must be constructed. The top slab should bear on a suitable foundation to prevent superimposed loads being transmitted to the unit and access shafts. Loads applied to covers and frames must bear on the top slab, not the access shaft.
- 5.15. The unit should be filled with clean water up to the invert level of the outlet pipe. Ensure the unit identification is placed/marked inside the neck for future information. The unit is now ready for use.

6.0 Alarm Installation

- 6.1 Install the alarm probe and control panel, as per the Suppliers Alarm Installation Guidelines. Ensure that the probe is positioned correctly for the required storage of oil. The table below indicates the volume of oil stored and the depth of floating oil expected in the separation chamber.

Unit	Recommended Maximum Oil Storage volume	Max. Depth of floating oil (100 %) (Static)
NSFA020	200 litres	53mm
NSFA030	300 litres	60mm
NSFA040	400 litres	65mm
NSFA050	500 litres	70mm
NSFA065	650 litres	67mm

7.0 Operation

- 7.1 The unit is sized on treating a defined area and rainfall (50 mm/hour) EN 858 Part 1, and using the factor provided in the EA guidelines PPG 3. The entire flow up to the units listed flow rating is fully treated.
- 7.2 Units include a core tube with replaceable media. Separated Liquid enters the core tube after passing through the media, to the outlet. The coalescer media requires maintenance and replacement at intervals. See section 8.
- 7.3 Units are provided with a closure device, incorporating a float. As the level of oil builds up and forms a floating layer, so the float/closure device moves downward to prevent oily water being passed through the unit. The unit **MUST** be emptied after the closure device has operated. The coalescer media should be inspected and changed if fouled.
- 7.4 An oil probe should be positioned to detect the accumulation of oil when there is no or low flow conditions. It is a requirement to position the probe so that the alarm operates at 90% of the maximum recommended oil storage volume. **When the alarm operates, the oil should be removed. Accumulated silt should also be removed.**
- 7.5 These Separators are not effective for the removal of soluble or emulsified pollutants such as oil/detergent mixes found in vehicle wash effluents. With permission, such discharges may be drained to the foul sewer. See Environment Agency Guidelines PPG3. Or contact our Technical Sales Department for suitable alternative equipment.

8.0 Maintenance

Separated light liquid **must** be removed from the separator when the oil capacity has been reached.

- 8.1. An oil level alarm system is available which gives warning when the separated light liquid/water interface level reaches 90% of the maximum recommended oil storage volume.
- 8.2. Separators should be inspected at least every six months or more frequently if experience dictates. A log should be maintained detailing the depth of oil found, any volume removed and any silt removal or cleaning carried out. A specimen maintenance log is included in the appendices.
- 8.3. Every site is different, in respect to the amount and type of silt generated by the drain design and installation. Frequently, the site construction programme itself generates large and perhaps unusual quantities of silt and grit. We recommend that following the initial installation, an inspection of the separator contents be made to check that building rubble has not entered the unit. Further inspections at 3 and 6 months should be made so as to be able to assess the volumes of silt and oil accumulated. An inspection and emptying programme can then be defined following the first 6 months site experience. We recommend a maximum inspection interval of 6 months.
- 8.4. Coalescer media is a replaceable item and is available as a spare.
- 8.5. Alarm probes should be removed and cleaned with water whenever waste material is removed from the separator. Please note the alarm may alert until the liquid level is replaced. Consult the alarm supplier's literature.
- 8.6. If the unit is emptied, the float/closure device should be raised and then lowered after the unit has been refilled. (Do not lower it into an empty unit as the closure device will self seat)
- 8.7. **Separator waste is a “special waste” under the terms of The Waste Management Code of Practice. The Code imposes a duty of care on the waste producer to ensure that the Cleansing contractor is registered with the Environment Agency and that the final disposal of the waste is to a licensed facility.**
- 8.8. You should consider the purchase of a maintenance service, from a competent installer, which includes bi-annual inspections, removal of oil and silt, cleaning of the alarm probe and cleaning or replacement of the coalescer media (where appropriate).

Waste Removal Procedure – Oil & Silt

Oil should only be removed when there is no flow entering the unit. Isolate the unit and prevent flow from entering. Always remove the oil before attempting to remove the coalescer. If this is not done, when the coalescer is withdrawn, any excess oil may coat the media surface and when replaced could contaminate the effluent.

- 8.9. Remove the access cover and lower the desludging hose into the separation chamber. Draw off the surface oil.
- 8.10. When removing the silt, lower the desludging hose to the base of the tank and withdraw any grit or sludge that may be present. It is not necessary to remove all the liquid unless you need to ensure the unit has been fully emptied. Ensure that you access and clean all compartments.
- 8.11. Remove the alarm probe, clean with water and replace. Ensure that it is working correctly
- 8.12. Consider the period of time that the coalescer has been installed and consider removing and inspecting (cleaning or replacing) the coalescer media. If removed, ensure that it is correctly replaced. It is best to lower the liquid level when refitting. Replace the access covers.
- 8.13. Re-fill the separator with clean water up to the outlet level. The alarm may display an alarm condition until the separator is re-filled. Check alarm operation when unit full.
- 8.14. Check the float/closure device and raise, if it has self-seated.

Checking the Coalescer Assembly

- 8.15. Coalescers should be checked and cleaned regularly, also following a major incident replaced if necessary. It may be possible to squeeze/rinse out silt contamination from the media, but it is impossible to remove oil. Please contact Kingspan if you wish to purchase replacement coalescer foam media. Identify the type and size of separator (shown on labels inside the access neck).
- 8.16. Assemblies weighing less than 25 Kg may be removed by hand. Heavier assemblies should be lifted by mechanical means. Any lifting device employed must be capable of lifting:
 - In excess of the maximum assembly weight.
 - The assembly completely out of the access shaft.
 - Giving a smooth and controlled lift.
 - Swinging the assembly to one side clear of the access shaft.

Unit	Dry Weight (Kg) Core tube & media	Wet Weight (Kg) Core tube & media	Silted Weight (Kg) Core tube & media	Replacement media part no.
NSFA020	27 kg	40 kg	≈ 55 kg	402733
NSFA030	27 kg	40 kg	≈ 55 kg	402733
NSFA040	27 kg	40 kg	≈ 55 kg	402733
NSFA050	27 kg	40 kg	≈ 55 kg	402733
NSFA065	27 kg	40 kg	≈ 55 kg	402733

- 8.17. Ensure that the area around the access shaft is clear and that there is space to place the coalescer core tube assembly once removed. If space is not available it will be necessary to support the assembly over the access shaft e.g. by scaffold poles and platform.
- 8.18. Only remove the access cover when necessary to remove the assembly. Do not leave the access shaft uncovered and unattended.
- 8.19. It is recommended that core tubes be lifted by mechanical means, especially if it is suspected that the coalescer media be silted.
- 8.20. Removing the coalescer assembly.**
- 8.21. A cut out is provided in the top of the coalescer tube to aid lifting. When the unit is installed the coalescer tube is bolted to the neck for transport. Deeper invert units are provided with a coalescer tube extension chain of the appropriate length.
- 8.22. Lift the assembly with a smooth and steady motion. Core tubes and media will become lighter as water drains from the exposed media. Allow the water to drain completely. Assemblies blocked with fine silt may be very heavy.

- 8.23. Fully extract the assembly and set it down adjacent to the access shaft. Consider cleaning or replacement of the media.

8.24. Cleaning the coalescer assembly /Media Replacement.

- 8.25. Hose down the assembly using clean water at normal pressure. (You may be able to return the cleaning water into the separator, if there is sufficient separator capacity.) Do not allow untreated cleaning water to pass out of the unit. Continue hosing media until the water runs clear. If the media is heavily contaminated with oil and silt it may not be possible to clean effectively by hosing and should be replaced.
- 8.26. When replacing the media, undo the banding. Slide media off the core tube and slide new media on. Ensure all the apertures on the core tube are covered by the media. Re-secure or replace banding. Consider replacing media every two years.

8.27. Replacing the coalescer assembly.

- 8.28. Position coalescer assembly over the access shaft and remove any safety coverings.
- 8.29. Lower the assembly steadily into the access shaft, orientate core tube correctly and locate over sump cone. Check the float/closure device is free to operate.

9.0 Emergencies

- 9.1. At sites where there is a high risk of spillage, spill kits containing drain seals, absorbent materials, disposal containers and other appropriate equipment should be held. In the event of a spillage on site, the material should be contained, (if a spill kit is not available, sand or soil may be used) and the Environment Agency notified immediately using the appropriate emergency hotline number listed in the Agency Guideline PPG3. Year 2012 – 0800 80 70 60

SEPARATOR MAINTENANCE LOG

Site address/location	
	
Separator location	
	
Type of separator	
Nominal Flow	
Total capacity	

[illegible]

012299
NSFA010 – NSFA015 Full Retention Separator
Installation & Operation Guidelines



Kingspan Environmental Service Contact Numbers:

GB: 0844 846 0500

NI: 028 3025 4077

IRL: 048 3025 4077

Enclosed Documents

DS0848P	NSFA010 – NSFA015 Full Retention Separators
DS0859P	Neck & Coalescer Extension Details NSFA Separators
PD0323	Oil Probe Fitting Details

Issue	Description	Date
06	CC1425 – Class 2 References Deleted	April 2018

HEALTH & SAFETY

These warnings are provided in the interest of safety. You must read them carefully before installing or using the equipment.

It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can be acquainted with the functioning of the equipment and the relevant warnings.

Installation should only be carried out by a suitably experienced contractor, following these guidelines.

We recommend the use of a dust mask and gloves when cutting GRP components.

Electrical work should be carried out by a qualified electrician.

Contaminated surface water can contain substances harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

Access covers should be selected with reference to the location of the unit and traffic loads to be accommodated. These are not (normally) part of the Separator supply.

When covers are removed precautions must be taken against personnel falling into the unit.

Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures.

Ensure that you are familiar with the safe working areas and accesses. Ensure that the working area is adequately lit.

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges.

OIL ALARM SYSTEMS

PPG3 recommends that the oil level alarm be fitted, tested and commissioned by a competent Installer. This is to ensure that the excessive oil probe is calibrated correctly, raising an alarm when 90% of the oil storage volume is reached. Should the oil level alarm fail to provide an early warning, excessive oil could pass through the separator, thus polluting the environment. This could result in substantial cleanup costs and legal action being taken under the water resources act 1991.

MAINTENANCE

The correct ongoing maintenance is essential for the proper operation of the equipment. Operators who rely on oil level alarms to prompt them to service separators between maintenance intervals run the risk of polluting, should the alarms not work, hence the ongoing functional assessment of the oil alarm systems is fundamental if pollution incidents are to be avoided.

The removal of sediment and retained oil/grease should be carried out by a contractor holding the relevant permits to transport and dispose of such waste. The contractor must refer to the guidelines in this document.



Kingspan Environmental
College Road North
Aston Clinton
Aylesbury
Buckinghamshire
HP22 5EW

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EN 858 : Separator systems for light liquids

GRP Glass Reinforced Plastic Tank

Full Retention Separators NS003 - NS200

Class 1 & 2

Watertightness	Passed
Structural Testing	Passed
Hydraulic efficiency	Passed

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Appendices

Separator Maintenance Log

1.0 Introduction

These Guidelines represent Best Practice for the installation of the above Kingspan Separator Units. Many years of specialist experience has led to the successful installation of thousands of separator units. It must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, a qualified specialist (e.g. Civil engineering consultant) must verify any information or advice given by employees or agents of Kingspan regarding the design of an installation.

For guidance of Separator selection and application, please refer to the most recent issue of Environment Agency Guidelines No.3 (PPG3) and BS EN 858. Our Units have been independently tested by BSI and are certified as meeting the standards.

2.0 Handling & Storage

- 2.1. Care must be taken to ensure that units are not damaged during delivery and handling on site. Please take care and place unit so that it can not fall and become damaged.
- 2.2. The design requirements of Kingspan products will frequently mean that the centre of gravity of the unit is "offset". Care must therefore be taken to ensure that the unit is stable when lifting. Rainwater may also collect inside units, particularly if they have been stored on site prior to installation, adding weight and increasing instability. Check units before lifting and pump out any excess water.
- 2.3. When lifting units, use webbing slings of a suitable specification. Do not use chains.
- 2.4. A suitable spreader bar should be used to ensure that units are stable and that loads are evenly distributed during lifting. When lifting separators, a spreader bar should be used where the slings would otherwise be at an angle > 30 degrees to the vertical.
- 2.5. Lifting equipment should be selected by taking into account the unit weight, length and the distance of lift required on site.
- 2.6. Kingspan accept no responsibility for the selection of lifting equipment.
- 2.7. Whenever Kingspan units are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects, which may damage the unit. The units must be placed on ground, which is flat and level to evenly support the base of the unit. Do not roll separators.

3.0 Site Planning

The following points should be considered before installation of the equipment:

- 3.1. The discharge must have the consent of the relevant Environmental Regulator.
- 3.2. The installation should have Planning and Building Control approval.
- 3.3. Consider installing flow cut-off valves to isolate the separator in an emergency or during site cleaning operations. See Environment Agency Guidelines PPG3.
- 3.4. Kingspan will fit a tube to receive the alarm probe. This tube provides protection and ensures that the probe is positioned at the correct level to sense the oil build up. The tube design and probe level setting assumes the use of Kingspan standard oil alarm system and may not be suitable for other alarm supplier's equipment. The probe tube may be fitted either within the neck or within the body of the unit. It should be extended to ground level when fitted in the body of the tank and you should make provision to extend the tube to the required height before backfilling. Consult the alarm supplier's instructions for they're detailed fitting installation instructions.
- 3.5. Consider venting of the unit. Comply with local regulations. In the UK, comply with the following regulations. For Petrol Stations: Health and Safety Guidance Note 41 (HS(G)41). For other applications: BS8301: 1985 (obsolescent) BS EN 752 Building Drainage. Adequate ventilation should be provided to the separator. The ventilation pipe should be as short as is practicable and be terminated not less than 2.5m above paving nor less than 1m above the head of an openable window or other opening into a building within a horizontal distance of 3m. Each neck should be vented independently, we advise against joining these below ground prior to their rising as vent stacks.
- 3.6. Uncontaminated run off such as roof water should be excluded from separators. (EA Guidelines PPG3.)
- 3.7. Consider installation of a sampling point downstream of the separator. There is no suitable facility to effectively sample the waste water from inside the unit. EN 858 Pt 1.
- 3.8. Ground conditions and water table level should be assessed. If the water table will be above the base of the units at any time of the year, adequate concrete backfill must be provided to avoid flotation. In poorly draining ground, consideration should also be given to the likelihood of flotation due to surface water collecting in the backfill, and an appropriate installation method devised to avoid this.
- 3.9. If the discharge is to a soakaway, a porosity test should be carried out as part of the assessment of suitability for sub-soil drainage.
- 3.10. The separator must be installed at a level that will allow connection to the incoming drain and a free discharge at the system outlet.
- 3.11. Do not install the unit deeper than necessary, if required, ensure that you purchase extension necks and coalescer extension chains. The minimum invert depth of the unit is shown on the customer drawing.
- 3.12. Adequate access must be provided for routine maintenance. Vehicles should not be permitted within a distance equal to the depth of the unit, unless suitable structural protection is provided to the installation.
- 3.13. There must be at least 1 metre of clear, level ground all around the access covers to allow for routine maintenance.
- 3.14. It is essential that a mains water supply is accessible for routine cleansing and refilling after removal of waste material and liquid.
- 3.15. Provide electrical supply for alarm system. (If required)
- 3.16. Installation should only be carried out by suitably qualified and experienced contractors in accordance with current Health and Safety Regulations. Electrical work should be carried out by a qualified electrician, working to the latest edition of IEE wiring regulations.
- 3.17. This unit is designed to operate with gravity in and out flows. The unit is not designed to operate with a pumped influent.

4.0 Installation – General

- 4.1. When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipework should be designed to minimise the risk of damage from differential movement of the unit(s) and/or surrounding material.
- 4.2. For separators with burial depths greater than 1000mm from cover level to the top of the unit, specific site conditions should be taken into consideration and the backfill designed to bear any loads which may be applied during and after installation to prevent the tank being subjected to these loads.
- 4.3. The excavation must be deep enough to provide bedding and cover depth as determined by the type of surface pavement and loading. Asphalt and concrete pads should extend a minimum of 300mm horizontally beyond the unit in all directions.
- 4.4. In situations where the excavation will not maintain a vertical wall, it will be necessary to shore up the side walls of the excavation with suitable trench sheets and bracing systems to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until the backfilling is complete, but before the concrete fully hardens.
- 4.5. In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be dewatered using suitable pumping equipment and this should continue until the installation is complete.
- 4.6. During installation care must be taken to ensure that the body of any unit is uniformly supported so that point loads through the unit are avoided.
- 4.7. The Concrete Specification is not a site specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES:	C25 /30 C25 /30 C16 /20	REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30 C20	270 - 280 Kg/M ³ 220 - 230 Kg/M ³
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

5.0 Separator Installation

- 5.1. Excavate a hole of sufficient length and width to accommodate the tank and a minimum 225mm concrete surround and to a depth that allows for the burial depth of the unit plus concrete base slab.
- 5.2. Construct a suitable concrete base slab appropriate to site conditions. Ensure that the slab is flat and level.
- 5.3. When the concrete base slab has set enough to support the installed load, add a concrete haunch so as to provide even support under the unit, then lower the unit onto the haunch using suitable webbing slings and lifting equipment.

- 5.4. Locate the float valve in the coalescer unit. Lift float valve and secure in the open position before filling and release when full. If the valve is not lifted during filling, it may "seat". The valve is fitted with cord to aid lifting. Add cord if extending the invert and fasten end to a convenient point.
- 5.5. **Pour no more than 300mm depth of clean water into the unit, avoiding shock loads. For units with more than one chamber, add water to each chamber simultaneously. DO NOT OVERFILL, the unit is not designed to hold water whilst unsupported. FILL THROUGH OUTLET AS WELL AS INLET.**
- 5.6. **Place concrete backfill to approximately 300mm depth under and to the sides of the tank ensuring good compaction to remove voids. DO NOT use vibrating pokers. Continue adding concrete backfill, simultaneously keeping the internal water level no more than 200mm above the backfill level at all times, until the backfill is just below the underside of the outlet drain, giving sufficient room to connect the inlet and outlet pipework.**
- 5.7. Connect inlet and outlet drains and vent pipes when safe access to the backfill can be gained.

PIPEWORK CONNECTIONS

In all cases, ensure that the outlet pipework level is maintained for correct operation. (Unless specified on the order, the fall across the unit will be as per the customer drawings). Small units are generally fitted with **PVCu spigots** to both the outlet and the inlet. Connect using the same size PVCu socket or a suitable reducer. Larger units are generally fitted with **Kingspan GRP** manufactured sockets. The connecting pipework should be pushed into the socket and a joint made to fill in the gap using rope/hemp with a cement mortar or bonding mix. Ensure that the seal is secure and watertight before backfilling the pipe.

Alternatively, proprietary **flex seal couplings** can be obtained to fit over the outside of the site pipework and the outside of the GRP socket. When using this connection method, please be aware that the outside GRP laminate is not perfectly regular and that you may need to use a sealant on the outside diameter of the GRP. Take care not to over tighten the coupling when connecting to the GRP and ensure that the seal is secure before backfilling the pipe. Drawing DS0185 provides the ID of our GRP sockets. The OD is variable, as the wall thickness can be up to 15-20 mm. If purchasing a flexseal coupling for use with clay/concrete, we suggest that a size 110 mm larger than the ID is selected.

5.8. **Oil Level Alarm Neck fitting**

Kingspan will fit a tube to receive the oil alarm probe. This provides protection and ensures that the probe is positioned at the correct level to sense oil build up. See alarm supplier information and ensure that the probe is placed within the tube and can be accessed from ground level.

Continue backfilling with concrete over the tank body to the required level. Build up a shell of concrete, minimum 225mm thick, around the access shaft(s). Temporarily strut the access shaft to avoid distortion.

- 5.9. Where Kingspan supply an extension shaft to meet a deeper invert requirement, a coalescer extension chain is also provided when needed. If there is a coalescer, remove it from the unit before adding the extension shaft(s). It is advisable to seal the joints on the extension shafts (particularly on sites with high ground water) with proprietary sealant or by GRP lamination (if skilled operatives are available). Temporarily strut the extension neck(s) to avoid distortion during back filling. Where more than one neck section is required to suit a deep invert, consider back-filling section by section. If the extension neck is too long, it can be trimmed using a fine-toothed saw. The original fixing hole bolting the coalescer to the neck should be sealed. Ensure that the vent socket if cut out, is replaced elsewhere. The maximum recommended inlet invert is 2000mm (using 500mm long extension sections). If you are installing a unit deeper than this then you must make your own arrangements for removing and replacing the coalescer. Consideration must be given to the depth of lift involved.
- 5.10. If extending the neck, remember to add a suitable length of cord to enable the float valve to be lifted when the unit is emptied. If the valve is not raised during filling then the float valve may stick at the base.
- 5.11. Coalescer. When refitting, ensure that the core tube is correctly seated onto the base fitting.
- 5.12. Continue back-filling, ensuring minimum 225mm concrete thickness around the access shaft/ extension neck and alarm access tube (as applicable).
- 5.13. Mains powered alarm Systems. See alarm suppliers installation instructions. Lay 82mm diameter PVCu underground ducting between the alarm panel location and the alarm probe position. The

012299-06 - Full Ret. Separators NSFA010 – NSFA015 - Installation & Operation Guidelines
ducting should be 500mm below ground level and fitted with a drawstring for later cable insertion. Any changes of direction should be by long radius bend. If necessary, drill a suitable hole in the access shaft adjacent to the alarm probe terminal box, to accept the ducting and seal.

- 5.14. In traffic areas a suitable top slab must be constructed. The top slab should bear on a suitable foundation to prevent superimposed loads being transmitted to the unit and access shafts. Loads applied to covers and frames must bear on the top slab, not the access shaft.
- 5.15. The unit should be filled with clean water up to the invert level of the outlet pipe. Ensure the unit identification is placed/marked inside the neck for future information. The unit is now ready for use.

6.0 Alarm Installation

- 6.1 Install the alarm probe and control panel, as per the Suppliers Alarm Installation Guidelines. Ensure that the probe is positioned correctly for the required storage of oil. The table below indicates the volume of oil stored and the depth of floating oil expected in the separation chamber.

Unit	Recommended Maximum Oil Storage volume	Max. Depth of floating oil (100 %) (Static)
NSFA010	100 litres	55mm
NSFA015	150 litres	45mm

7.0 Operation

- 7.1 The unit is sized on treating a defined area and rainfall (50 mm/hour) EN 858 Part 1, and using the factor provided in the EA guidelines PPG 3. The entire flow up to the units listed flow rating is fully treated.
- 7.2 Units include a core tube with replaceable media. Separated Liquid enters the core tube after passing through the media, to the outlet. The coalescer media requires maintenance and replacement at intervals. See section 8.
- 7.3 Units are provided with a closure device, incorporating a float. As the level of oil builds up and forms a floating layer, so the float/closure device moves downward to prevent oily water being passed thorough the unit. The unit **MUST** be emptied after the closure device has operated. The coalescer media should be inspected and changed if fouled.
- 7.4 An oil probe should be positioned to detect the accumulation of oil when there is no or low flow conditions. It is a requirement to position the probe so that the alarm operates at 90% of the maximum recommended oil storage volume. **When the alarm operates, the oil should be removed. Accumulated silt should also be removed.**
- 7.5 These Separators are not effective for the removal of soluble or emulsified pollutants such as oil/detergent mixes found in vehicle wash effluents. With permission, such discharges may be drained to the foul sewer. See Environment Agency Guidelines PPG3. Or contact Kingspan Technical Sales Department for suitable alternative equipment.

8.0 Maintenance

Separated light liquid **must** be removed from separator when the oil capacity has been reached.

- 8.1. An oil level alarm system is available which gives warning when the separated light liquid/water interface level reaches 90% of the maximum recommended oil storage volume.
- 8.2. Separators should be inspected at least every six months or more frequently if experience dictates. A log should be maintained detailing the depth of oil found, any volume removed and any silt removal or cleaning carried out. A specimen maintenance log is included in the appendices.
- 8.3. Every site is different, in respect to the amount and type of silt generated by the drain design and installation. Frequently, the site construction programme itself generates large and perhaps unusual quantities of silt and grit. We recommend that following the initial installation, an inspection of the separator contents be made to check that building rubble has not entered the unit. Further

012299-06 - Full Ret. Separators NSFA010 – NSFA015 - Installation & Operation Guidelines
inspections at 3 and 6 months should be made so as to be able to assess the volumes of silt and oil accumulated. An inspection and emptying programme can then be defined following the first 6 months site experience. We recommend a maximum inspection interval of 6 months.

- 8.4. Coalescer media is a replaceable item and is available as a spare.
- 8.5. Alarm probes where fitted, should be removed and cleaned with water whenever waste material is removed from the separator. Please note the alarm may alert until the liquid level is replaced. Consult the alarm supplier's literature.
- 8.6. If the unit is emptied, the float/closure device should be raised and lowered only after the unit has been refilled. (Do not lower it into an empty unit as the closure device will self seat)
- 8.7. **Separator waste is a “special waste” under the terms of The Waste Management Code of Practice. The Code imposes a duty of care on the waste producer to ensure that the Cleansing contractor is registered with the Environment Agency and that the final disposal of the waste is to a licensed facility.**
- 8.8. You should consider the purchase of a maintenance service, from a competent installer, which includes bi-annual inspections, removal of oil and silt, cleaning of the alarm probe and cleaning or replacement of the coalescer media (where appropriate).

Waste Removal Procedure – Oil & Silt

Oil should only be removed when there is no flow entering the unit. Isolate the unit and prevent flow from entering. Always remove the oil before attempting to remove the coalescer. If this is not done, when the coalescer is withdrawn, any excess oil may coat the media surface and when replaced could contaminate the effluent.

- 8.9. Remove the access cover and lower the desludging hose into the separation chamber. Draw off the surface oil.
- 8.10. When removing the silt, lower the desludging hose to the base of the tank and withdraw any grit or sludge that may be present. It is not necessary to remove all the liquid unless you need to ensure the unit has been fully emptied. Ensure that you access and clean all compartments.
- 8.11. Remove the alarm probe, if fitted, clean with water and replace. Ensure that it is working correctly
- 8.12. Consider the period of time that the coalescer has been installed and consider removing and inspecting (cleaning or replacing) the coalescer media. If removed, ensure that it is correctly replaced and secured into position. It is best to lower the liquid level when refitting. Replace the access covers
- 8.13. Re-fill the separator with clean water up to the outlet level. If an alarm is fitted, it may display an alarm condition until the separator is re-filled. Check alarm operation when unit full.
- 8.14. Check the float/closure device and raise, if it has self-seated.

Checking the Coalescer Assembly

- 8.15. Coalescers should be checked and cleaned regularly, also following a major incident replaced if necessary. It may be possible to squeeze/rinse out silt contamination from the media, but it is impossible to remove oil. Please contact Kingspan if you wish to purchase replacement coalescer foam media. Identify the type and size of separator (shown on labels inside the access neck).
- 8.16. Assemblies weighing less than 25 Kg may be removed by hand. Heavier assemblies should be lifted by mechanical means. Any lifting device employed must be capable of lifting:
 - In excess of the maximum assembly weight.
 - The assembly completely out of the access shaft.
 - Giving a smooth and controlled lift.
 - Swinging the assembly to one side clear of the access shaft.

Unit	Dry Weight (Kg) Core tube & media	Wet Weight (Kg) Core tube & media	Silted Weight (Kg) Core tube & media	Replacement media part no.
NSFA010	11 kg	21 kg	≈ 30 Kg	402672
NSFA015	11 kg	21 kg	≈ 30 Kg	402672

- 8.17. Ensure that the area around the access shaft is clear and that there is space to place the coalescer core tube assembly once removed. If space is not available it will be necessary to support the assembly over the access shaft. e.g. by scaffold poles and platform.
- 8.18. Only remove the access cover when necessary to remove the assembly. Do not leave the access shaft uncovered and unattended.
- 8.19. The core tube from standard invert units may generally be lifted by hand, but should you suspect that the coalescer media be silted, additional lifting equipment should be employed.

8.20. Removing the coalescer assembly.

- 8.21. A hand hold cutout is provided in the top of the coalescer tube. When the unit is installed the coalescer tube is bolted to the neck for transport. Deeper invert units are provided with a coalescer tube extension chain of the appropriate length.
- 8.22. Lift the assembly with a smooth and steady motion. Core tubes and media will become lighter as water drains from the exposed media. Allow the water to drain completely. Assemblies blocked with fine silt may be very heavy.
- 8.23. Fully extract the assembly and set it down adjacent to the access shaft. Consider cleaning or replacement of the media.

8.24. Cleaning the coalescer assembly /Media Replacement.

- 8.25. Hose down the assembly using clean water at normal pressure. (You may be able to return the cleaning water into the separator, if there is sufficient separator capacity.) Do not allow untreated cleaning water to pass out of the unit. Continue hosing media until the water runs clear. If the media is heavily contaminated with oil and silt it may not be possible to clean effectively by hosing and should be replaced.
- 8.26. When replacing the media, undo the banding. Slide media off the core tube and slide new media on. Ensure all the apertures on the core tube are covered by the media. Re-secure or replace banding. Consider replacing media every two years.

8.27. Replacing the coalescer assembly.

- 8.28. Position coalescer assembly over the access shaft and remove any safety coverings.
- 8.29. Lower the assembly steadily into the access shaft, orientate core tube correctly and locate over sump cone. Check the float/closure device is free to operate.

9.0 Emergencies

- 9.1. At sites where there is a high risk of spillage, spill kits containing drain seals, absorbent materials, disposal containers and other appropriate equipment should be held. In the event of a spillage on site, the material should be contained, (if a spill kit is not available, sand or soil may be used) and the Environment Agency notified immediately using the appropriate emergency hotline number listed in the Agency Guideline PPG3. Year 2012 – 0800 80 70 60

SEPARATOR MAINTENANCE LOG



Site address/location

Separator location

Type of separator

Nominal Flow

Total capacity

[illegible]

APPENDIX B

DRAINAGE NOTES

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS DRAWINGS AND SPECIFICATIONS.

DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON THE DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED AND VERIFIED ON SITE.

ALL DRAINAGE WORKS TO BE IN ACCORDANCE WITH THE CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY (CESM) AS INCLUDED IN SEWERS FOR ADOPTION 7TH EDITION, THE REQUIREMENTS OF APPROVED DOCUMENT H (2015 EDITION), BUILDING REGULATIONS 2000 AND THE DETAILS PROVIDED ON THE CONTRACT DRAWINGS.

THE CONTRACTOR MUST SURVEY THE RETAINED DRAINAGE AND REPORT THE LINE, LEVEL AND CONDITION OF THE EXISTING DRAINAGE TO THE ENGINEER. WE WOULD RECOMMEND THAT THE EXISTING DRAINAGE TO BE SURVEYED IS CLEARED BEFORE UNDERTAKING THESE WORKS.

ANY REDUNDANT MANHOLES ARE TO BE BROKEN OUT AND BACKFILLED WITH A APPROVED COMPACTED GRANULAR MATERIAL. REDUNDANT PIPES ARE TO BE FILLED WITH A 10:1 PFA/CEMENT MIX OR BROKEN OUT AND BACKFILLED WITH A APPROVED COMPACTED GRANULAR MATERIAL.

ALL FOUL AND SURFACE WATER DRAINS UP TO AND INCLUDING 300MM DIAMETER ARE TO BE VITRIFIED CLAY SUCH AS HEPWORTH SUPERSLEVE/SUPERSEAL OR SIMILAR APPROVED (BS EN 295-1). ALL PIPES GREATER THAN 300MM DIAMETER TO BE CONCRETE CLASS 120 (BS EN 1916:2002). ALL CONCRETE MANHOLES TO BE IN ACCORDANCE WITH BS EN 1917.

AS AN ALTERNATIVE (SUBJECT TO THE CLIENTS APPROVAL) THE CONTRACTOR MAY USE STRUCTURAL WALLED PIPES (MSA 4-35-01 & BS EN 13476) SUCH AS;

- POLYSEWER - POLYPIPE BUILDING PRODUCTS - SIZE 150mm to 300mm
- QUANTUM - MARLEY - SIZE 150mm to 300mm
- ULTRARIB - UPONOR - SIZE 150mm to 300mm
- ULTRARIB - WAIN - SIZE 150mm to 300mm
- RIDGSEWER - POLYPIPE CIVILS LTD - SIZE 400mm to 900mm
- MEHULITE - ASSET INTERNATIONAL - SIZE 450mm to 3000mm

PIPES LAID WITHIN VEHICLE TRAFFICKED AREAS WITH LESS THAN 900mm OF COVER SHALL BE SURROUNDED IN CLASS 2 BEDDING, PIPES LESS THAN 300mm BELOW THE UNDERSIDE OF A GROUND FLOOR SLAB SHALL BE SURROUNDED IN CLASS 2 BEDDING, WHERE EVERY CLASS 2 BEDDING IS USED AS A SURROUND A COMPRESSIBLE MATERIAL MUST BE PLACED AT EVERY PIPE JOINT. ALL OTHER PIPES ARE TO BE LAID IN A CLASS 3 BEDDING.

ALL DRAINAGE MUST BE PROTECTED DURING CONSTRUCTION WHERE INTERMEDIATE COVER IS LESS THAN 900mm.

WHERE FOUL AND SURFACE DRAINS/SEWERS CROSS WITHIN 100mm OF EACH OTHER CONCRETE PROTECTION (CLASS 2 BEDDING) MAY BE REQUIRED TO PREVENT ANY POTENTIAL CONTAMINATION.

ALL COVER LEVELS ARE APPROXIMATE ONLY. ALL MANHOLE COVERS TO BE SET AT THE PROPOSED FINISHED PAVEMENT OR FLOOR LEVEL. REFER TO THE ARCHITECTS PROPOSED LEVELS DRAWING FOR LEVEL CONFIRMATION.

FOR TYPICAL MANHOLE CONSTRUCTION DETAILS, PIPE BEDDING/TRENCH DETAILS AND OTHER ASSOCIATED DRAINAGE DETAILS. REFER TO SGI TYPICALS DRAWING.

ALL FOUL AND SURFACE WATER CONNECTIONS TO BE 100MM DIAMETER UNLESS STATED. ALL EXTERNAL GULLY CONNECTIONS AND CHANNEL DRAIN SUMP/GULLY CONNECTIONS TO BE 150mm DIAMETER UNLESS STATED. ALL GULLY AND CHANNEL DRAIN OUTLETS TO BE TRAPPED AND RODDABLE. ALL INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.

CHANNELS DRAINS TO BE FITTED WITH A HEALGUARD CAST IRON GRATING. GRATINGS TO BE TO LOAD CLASS D400 SPECIFICATION UNLESS OTHERWISE AGREED. LINEAR CHANNELS TO HAVE A 200mm MINIMUM CONCRETE BED AND HAUNCH.

ALL FOUL STACKS AND RWP'S TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT SIZE TO BE IN ACCORDANCE WITH DOCUMENT H AND STED ABOVE ANY CONNECTED GROUND FLOOR APPLIANCE SPILL LEVEL.

ALL CONNECTIONS PASSING THROUGH FOUNDATION BASES AND/OR EDGE BEAMS TO BE WITHIN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150mm FROM FACE OF THE CONCRETE.

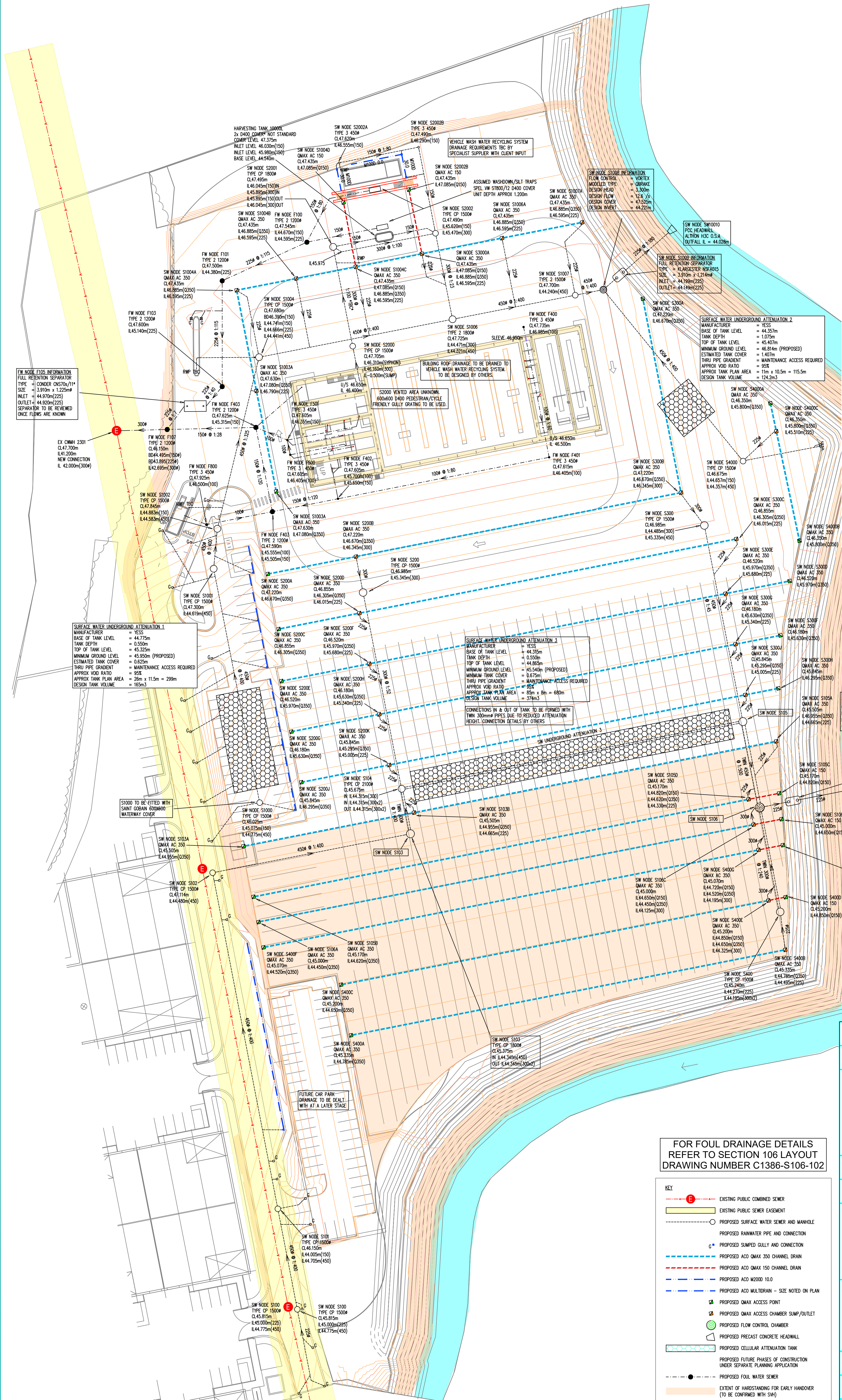
ALL MANHOLE COVERS LOCATED WITHIN THE ROAD AND CAR PARKING AREAS TO BE D400 CLASS. COVERS WITHIN HARD AND SOFT LANDSCAPED AREAS WITH PEDESTRIAN TRAFFIC ONLY TO BE B125 CLASS. COVERS LOCATED WITHIN BLOCK/PAVING AREAS TO BE RECESSED TO SUIT THE PROPOSED PAVING AND OF THE APPROPRIATE GRADE. ALL INTERNAL COVERS TO BE RECESSED WITH DOUBLE SEALED BOLT DOWN COVERS SUCH AS HOWE GREEN 5000 SERIES OR SIMILAR APPROVED.

CHANNELS WITHIN TYPE 1 & 2 MANHOLES MUST USE PRE-FORMED CLAYWARE SECTIONS FOR PIPES UP TO AND INCLUDING 300mm DIAMETER. CHANNELS TO BE SET AT THE APPROPRIATE INCOMING AND OUTGOING PIPE GRADIENTS.

ALL MANHOLES CONNECTIONS TO BE FORMED AT SOFFIT TO SOFFIT UNLESS OTHERWISE STATED. ALL BRANCH CONNECTIONS TO BE MADE WITH SWEPT BENDS IN THE DIRECTION OF FLOW IN THE MAIN SEWER. INTERNAL DRAINAGE CONNECTIONS ARE PROVIDED TO THE PENETRATION POSITIONS SHOWN ON AND COORDINATED BY THE ARCHITECT/M&E CONSULTANT.

EXTERNAL LINEAR CHANNEL DRAINS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND SHALL DISCHARGE VIA TRAPPED RODDABLE GULLY UNITS UNLESS ADVISED OTHERWISE. LINEAR CHANNELS AND HEALGUARD CAST IRON GRATINGS TO BE TO LOAD CLASS D400 SPECIFICATION. ALL CHANNELS SHALL HAVE A 200mm MINIMUM CONCRETE BED AND HAUNCH.

THE TYPE AND SIZE OF THE SEPARATOR IS SPECIFIED ON THIS DRAWING AND SHALL BE A CLASS 1 TYPE. IT SHALL BE INSTALLED IN COMPLETE ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS AND VENTED VIA 75mm PIPE WORK. THE INTERCEPTOR REQUIRES POWER FOR THE HIGH LEVEL ALARM AND THE ARRANGEMENT SHALL BE INTRINSICALLY SAFE AND EXPLOSION PROOF. THE CONTRACTOR SHALL PROVIDE THE REQUIRED DUCTING & CABLEING TO INTERNAL MONITORING POSITION TOGETHER WITH AUDIO AND VISUAL MONITORING UNIT ALL IN ACCORDANCE WITH BS7671:2008 +A1:2011



FOR FOUL DRAINAGE DETAILS
REFER TO SECTION 106 LAYOUT
DRAWING NUMBER C1386-S106-102

- KEY
- EXISTING PUBLIC COMBINED SEWER
 - EXISTING PUBLIC SEWER EASEMENT
 - PROPOSED SURFACE WATER SEWER AND MANHOLE
 - PROPOSED RAINWATER PIPE AND CONNECTION
 - PROPOSED SUMPED GULLY AND CONNECTION
 - PROPOSED ACO QMAX 350 CHANNEL DRAIN
 - PROPOSED ACO QMAX 150 CHANNEL DRAIN
 - PROPOSED ACO M2000 10.0
 - PROPOSED ACO MULTIDRAIN - SIZE NOTED ON PLAN
 - PROPOSED QMAX ACCESS POINT
 - PROPOSED QMAX ACCESS CHAMBER SUMP/OUTLET
 - PROPOSED FLOW CONTROL CHAMBER
 - PROPOSED PRECAST CONCRETE HEADWALL
 - PROPOSED CELLULAR ATTENUATION TANK
 - PROPOSED FUTURE PHASES OF CONSTRUCTION UNDER SEPARATE PLANNING APPLICATION
 - PROPOSED FOUL WATER SEWER
 - EXTENT OF HANDSTANDING FOR EARLY HANDOVER (TO BE CONFIRMED WITH SWH)

C11	Interceptor reference change	07.09.2021
C10	Interceptor Position adjusted to suit comments	12.02.2021
C9	Flow Control changes to ACO Qbrake type	17.11.2020
C8	Highway drainage amended to suit latest levels	05.11.2020
C7	Gully within washdown pit updated.	28.10.2020
C6	Foul grade downstream changed to 1:115	
C5	Drainage at wash area adjusted	22.10.2020
C4	SW1003 removed as discussed	16.10.2020
	Pop-ups corrected. RMP from Filling station amended	15.10.2020

Salford Van Hire

Innov8 Development Solutions

Scale: **1/500** Date: **21.07.2020** Drawn by: **DOR**

Surface Water Drainage Review

SGI Shepherd Gilmour Consulting Engineers
Colchester House, 40 Peter Street, Manchester M2 5GP.
Phone: 0161 837 1500. E-mail: sgi@sgiconsulting.co.uk
Web: www.sgiconsulting.co.uk

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Status: **Construction**