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LIDL

New Hey Road, Huddersfield

SURFACE WATER MAINTENANCE PLAN

Final Report



November 2024

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Infrastructure Highways Transport

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Cora IHT

Infrastructure Highways Transport

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1.0 INTRODUCTION

1.1 Brief

- 1.1.1 Cora IHT have been instructed by Lidl to prepare a Surface Water Maintenance Plan to support proposals for a new LIDL store located off New Hey Road in Huddersfield. **Figure 1.1** illustrates the site location.

Figure 1.1: Site Location



- 1.1.2 **Appendix A** provides the full drainage drawings.
- 1.1.3 The requirement for a Surface Water Maintenance Plan is based on the duty to ensure that surface water quality and quantity is managed and maintained throughout the construction and operational stages to mitigate impacts off site.

2.0 CONSTRUCTION SURFACE WATER MANAGEMENT PLAN

2.1 *Site Activity Where Water Will Be Used*

- 2.1.1 The table below identifies the key activities where water is required during the construction phase of the scheme.
- 2.1.2 Potable Sources – Where possible existing water connection to the site will be used. If this is not possible water will be supplied to the construction site by tanker.
- 2.1.3 The lists below are not exhaustive and should be added too as necessary by the nominated contractor.

Activity	Water Use (Obligatory to maintain operations)	Source: Potable or Non-Potable
Site Cabin Related Activities	Drinking, kitchen, canteen.	Potable
	Toilets and urinals, showers and hand washing.	Non-potable
Drainage	Flushing.	Both
General Cleaning	Tool rinsing, boot washing, plant and equipment washing.	Non-potable
Site Dust Suppression	Dampening (bowzers) and Misting	Non-potable
Drilling	Lubricant.	Potable (if pressure required)

2.2 *Methods of Sustainable Management of Water sources*

- 2.2.1 Efforts to reduce the use of water during construction could be achieved through the use of efficient technologies and practises for each key construction activity. Options to reduce the potable water demand would be considered and the most appropriate options to satisfy the requirements of the scheme.

Activity	Options to Reduce Potable Water Demand on Key Sources
Site Cabin Related Activities	Efficient showers, taps, toilets and urinal controls. Trigger control on catering taps and use of vessels for washing rather than under running taps. Rainwater capture for toilet flushing. Waterless urinals.
Drainage	Reuse water collected from activities, e.g. dewatering. Use water from attenuation tanks or rainwater harvest tanks, as outlined in the Initial CEMP (DCO Document Reference 7.3) and Energy Reduction Plan.
General Cleaning	Fill containers rather than use running taps or open hoses. Trigger operated spray guns. Use of a closed water recycling system.

Activity	Options to Reduce Potable Water Demand on Key Sources
Site Dust Suppression in relation to Soil Stripping	Use of control systems to allow damping activities to be altered for different applications and weather conditions. Use of water efficient road sweepers and dust suppression vehicles which recirculate water and/or have efficient spraying mechanisms such as a hydraulic spinning system. Use water collected elsewhere on site, such as from Sustainable Drainage Systems (SuDS), for dust suppression activities (may require on-site treatment).
Drilling	Inspect water hose lines for leakage and repair or replace as required. Watertight circulation tanks, rather than pits. Use of meters on supply lines/consumption monitoring for high demand activities.

2.3 Managing Surface Water During Construction

2.3.1 Contaminated water can arise from a number of sources including:

- direct disturbance of the riverbed or bank.
- de-watering of excavations.
- run-off from exposed ground and material stockpiles
- run-off from roads and haul routes and river crossings.
- plant washings.
- fuel and chemical storage/refuelling areas.
- leaking/vandalised equipment.

2.3.2 Flooding from surface water sources is a potential risk during short, intense rain storms or longer duration storms, when the capacity of the underlying soils and drainage systems is exceeded and rainfall runs overland to pond in natural or formed low points, it is therefore important that due consideration is given to the changes in surface water runoff.

2.3.3 The construction site would cause temporary increases in the coverage of impermeable surfaces, in particular the visitor parking spaces, material compound and site cabins. These areas have the potential to result in localised increases in the rates and volumes of runoff that are generated during storm events. If not appropriately managed this may present risks of flooding onsite or offsite in the wider catchment areas. In the absence of appropriate drainage management measures, this could also lead to an increase in flood levels across the site.

2.3.4 The following measures should be employed by the contractor to manage surface water:

- Vehicular traffic would be limited to designated routes through the site to avoid soil compaction and the associated increased likelihood of surface water runoff.
- SuDS measures within the scheme should include:

- Aggregates (permeable granular material) to reduce the areas of impermeable materials.

2.3.5 Locate areas of high risk away from watercourses and drainage paths. Areas of high risk include:

- fuel and chemical storage.
- refuelling areas.
- material stockpiles.
- vehicle and equipment washing areas.
- site compounds/parking areas.

2.3.6 Store fuel, oils and chemicals on an impervious base within a bund able to contain at least 110% of the volume stored.

2.3.7 If possible, use biodegradable oil in plant and machinery. Biodegradable oil is less toxic than most synthetic oil but should still be used and stored to the same standards as other oils.

2.3.8 Divert clean surface water away from exposed soils This can significantly reduce the volume of water contaminated with sediment on site thus reducing the risk of pollution and the costs associated with treating contaminated water before discharge.

- Diversion drains. Such diversion can be implemented on the upstream perimeter of the site or immediately upstream of areas of exposed soil on the site (e.g. excavations, embankments and stockpiles). Line drains with a non-erodible material such as turf/geotextiles.
- Bunds. These can be placed around exposed soils such as excavations/material stockpiles. This will prevent clean water entering the area and dirty water from leaving the area. Bunds should be made of non-erodible material such as straw bales/geotextiles.

2.3.9 Leave as much existing vegetation in place as possible and protect it with fences and signs where necessary. Only clear that part of the site which will be worked on in the near future. Consider phasing site clearance for different stages of the work.

2.3.10 There are many techniques and existing guidance to assist in minimising the mobilisation and loss of sediments in waters. In most cases this will involve collecting the polluted run-off and routing it to treatment by filtration, settlement or specialist techniques. As well as treatment immediately prior to discharge, polluted water can be treated at source and enroute to the discharge point – though this does not necessarily negate the need for further treatment before discharge. Widely used techniques include:

- diversion drains/ditches.
- silt fence.
- fibre roll.
- filter bund.
- Silt trap ;
- Haul routes and site entrances ; and
- Surface drainage protection.

3.0 SURFACE WATER MAINTENANCE PLAN

3.1 *Maintenance Strategy*

3.1.1 SuDS components require good maintenance including inspections to identify performance issues and plan appropriate maintenance needs, checks on the operation and maintenance of the drainage system and landscape management. Therefore, it is intended that those responsible for the drainage within a development will be provided with an Operation and Maintenance Manual as part of the documentation provided under the Construction (Design and Management) regulations 2015 at the end of the construction works. Maintenance requirements that would be appropriate for this development, to be included in the document are outlined below.

3.1.2 All maintenance necessary will be undertaken, appointed and/or suitably managed by Lidl Great Britain Limited

3.1.3 The Drainage network and inherent SuDS have been designed with minimal maintenance in mind. The maintenance is generally of a 'common sense' approach and is to comprise:

- Regular day to day care: - litter collection, grass cutting and checking the inlets and outlets where water enters or leaves a drainage feature.
- Occasional tasks: - managing vegetation in wet areas (ponds, swales, etc.) and removing any silt that builds up in the drainage features.
- Remedial work: -repairing damage when, and where, necessary.

Specific recommendations for each feature are provided in the following sections and should be referred to in the first instance if there are any issues.

3.2 *Inlets, Outlets, Flow Control Device and Inspection Chambers*

3.2.1 Inlets and outlets structures may be surface structures or conveyance pipes with guards or headwalls. They must be free from obstruction at all times.

3.2.2 The surface water flow off site is limited to the agreed rates as shown in the drawings in **Appendix A**. The flow is limited by a Hydrobrake. This is a proprietary system and will be installed in line with the manufacturers written instructions. Operation and Maintenance guidance is provided within the manufacturers' standard documentation.

Maintenance schedule	Required action	Frequency
Regular Maintenance	Inlets, outlets and surface control structures Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage. Strim vegetation 1m min. surround to structures and keep hard aprons free from silt and debris	Monthly (or as required).
Occasional Maintenance	Check topsoil levels are 20mm above edges of baskets and chambers to avoid mower damage	As required.

Remedial Works	Unpack stone in basket features and unblock or repair and repack stone as design detail as necessary. As required Repair physical damage if necessary	As required.
Inspection chambers and below ground	Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn	Every 6 months (or as required).

3.3 Attenuation Tank

- 3.3.1 Regular inspection of cellular storage tank systems is required to ensure effective long-term performance of the system. Maintenance needs of the system should be monitored, and schedules adjusted to suit the specific requirements of the Development.
- 3.3.2 The following maintenance regime is recommended as a minimum, but actions and frequencies should be adjusted to suit the specific requirements of the food store and associated car parking. Manufacturer's specific recommendations should also be followed.
- 3.3.3 The proposed cellular tank if installed in accordance with the manufacturers recommendations has a design life in excess of 60 years, as a result should it be maintained in line with the recommendation below and the literature within Appendix B the facility will not need to be replaced for the life of the store.
- 3.3.4 The proposed geocellular units have received an agreement certificate form the BBA included within Appendix B

Maintenance schedule	Required action	Frequency
Regular Maintenance	- Inspect and identify incorrect operation. - Debris removal from catchment area using sweeping and vacuuming. - Removal of silt and debris from rainwater gutters. - Removal of sediment from pre-treatment components i.e. catchpits.	Monthly (or as required).

3.4 Spillage -Emergency Action

- 3.4.1 Most spillages on development sites are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.

-
- 3.4.2 In the event of a serious spillage, either by volume or of unknown or toxic compounds, then isolate the spillage with soil, turf or fabric and block outlet pipes from chamber(s) downstream of the spillage with a bung(s). (A bung for blocking pipes may be made by wrapping soil or turf in a plastic sheet or close woven fabric.) Contact the Environment Agency immediately.

APPENDICES

APPENDIX A – DRAINAGE DRAWINGS



ALL COVER AND INVERT LEVELS ARE SHOWN INDICATIVELY, BOTH LEVELS ARE TO BE CONFIRMED ONCE THE PROPOSED FFL LEVELS HAVE BEEN SET AND EXTERNAL CAR PARK GRADIENTS AGREED

DRAINAGE NOTES

- ALL NON ADOPTABLE DRAINS UP TO 150 Dia. TO BE 'POLYPIPE' uPVC UNDERGROUND DRAIN MANUFACTURED IN ACCORDANCE WITH BS EN 1401-1 OR EQUAL APPROVED.
- ALL NON ADOPTABLE DRAINS WITH A PIPE Dia. of 225 or 300 TO BE EITHER A PLAIN WALLED PLASTIC PIPE TO BS 1401-1 (POLYSEWER) OR A STRUCTURED WALL PLASTIC PIPE TO WIS-04-35-01 'POLYSEWER'. OR EQUAL APPROVED
- ALL ADOPTABLE DRAINS UP TO 300 Dia. TO BE 'POLYSEWER' BY 'POLYPIPE' AND MANUFACTURED IN ACCORDANCE WITH THE WATER INDUSTRY SPECIFICATION WIS-4-35-01.
- DRAINAGE PIPEWORK 400mm to 600mm DIA TO BE 'RIDGIDRAIN' HDPE, BY POLYPIPE OR EQUAL APPROVED.
- ALL PIPE LENGTHS NOT TO EXCEED 3m.
- DRAINS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
- NEW INSPECTION CHAMBERS (IC) TO BE A MINIMUM OF 450MM DIA. EXCEPT FOR MINI ACCESS CHAMBERS WHICH MAY BE SMALLER, REFER TO M.H. SCHEDULE FOR ACTUAL SIZES.
- ALL EXTERNAL RAINWATER PIPES (RWP) TO BE TERMINATED AT RODDABLE GULLIES. INTERNAL RWP'S TO ARCHITECTS DETAILS BUT SHOULD ALLOW FOR RODDABLE ACCESS.
- FOR ALL DRAINAGE ABOVE GROUND FLOOR SLAB INCLUDING SETTING OUT FOR PENETRATIONS THROUGH THE GROUND FLOOR SLAB REFER TO ARCHITECTS DRAWING & SPECIFICATIONS
- ANY DRAINS PASSING THROUGH SUBSTRUCTURE WALLS TO HAVE A MINIMUM 50mm CLEAR SPACE, RC LINTEL SUPPORT ABOVE & CEMENT FIBRE COLLARS EITHER SIDE TO PREVENT VERMIN ENTRY.
- ANY DRAINS CAST IN & PASSING THROUGH CONCRETE GROUND BEAMS TO HAVE A FLEXIBLE JOINT NOT MORE THAN 150mm FROM THE FACE OF THE GROUND BEAM. (FLEXIBLE JOINT TO MANUFACTURERS DETAILS) AND A MAXIMUM 600mm LONG ROCKER PIPE EITHER SIDE
- ANY ALTERATIONS TO DRAINAGE PROPOSED BY CONTRACTOR TO BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF WORK ON SITE. ANY REVISIONS ARE ALSO SUBJECT TO THE APPROVAL OF THE LOCAL BUILDING INSPECTOR.
- ALL DRAINS RUNNING UNDER BUILDINGS TO HAVE A MINIMUM FALL OF 1:40 TOWARDS THE BUILDING EXTERIOR. PIPE TO BE ENCASED IN 100mm GRANULAR FILL. COVER LEVELS SHOWN ARE APPROXIMATE ONLY AND SHOULD BE ALTERED TO SUIT FINISHED SURFACE LEVELS.
- THE BEDDING SPECIFICATION FOR ALL DRAINS WHERE COVER IS GREATER THAN 420mm SHALL BE TYPE 'S'. WHERE COVER IS LESS THAN 1200mm TYPE 'Z' SHALL BE USED.
- THE DEVELOPER/CONTRACTOR MUST SELF VET AND CERTIFY THAT THE DESIGN CRITERIA, MATERIAL STANDARDS AND WORKMANSHIP SPECIFICATIONS FOR THE PROPOSED SEWERS ARE IN ACCORDANCE WITH THOSE SET OUT IN 'SEWERS FOR ADOPTION 7TH EDITION'
- PROPOSED COVER AND INVERT LEVELS TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO ANY WORKS COMMENCING ONSITE
- ALL PPIC'S LOCATED WITHIN VEHICLE AREAS TO RECEIVE A MINIMUM 150mm CONCRETE BED AND SURROUND

KEY

- PROPOSED SURFACE WATER SEWER
- PROPOSED 150mmØ FOUL WATER SEWER
- PROPOSED PUMP STATION AND RISING MAIN
- PROPOSED ROUTE OF DIVERTED CULVERT EXACT DEPTH TO BE CONFIRMED
- POLYSTORM R ATTENUATION SYSTEM BY POLYPIPE OR SIMILAR APPROVED
- NEW FOUL WATER INSPECTION CHAMBER 450mm DIAMETER
- NEW FOUL WATER MANHOLE 1200mm DIAMETER
- NEW SURFACE WATER MANHOLE 1200mm DIAMETER
- PROPOSED HYDROBRAKE FLOW CONTROL DEVICE
- NEW SURFACE WATER CATCHPIT 600mm DIAMETER
- EXISTING FOUL AND SURFACE WATER FEATURES TO BE INVESTIGATED TO IDENTIFY POTENTIAL EXISTING OUTFALLS
- PROPOSED GULLY

Cora^{iHt}

Client LIDL GREAT BRITAIN Ltd

Project NEW HEY ROAD

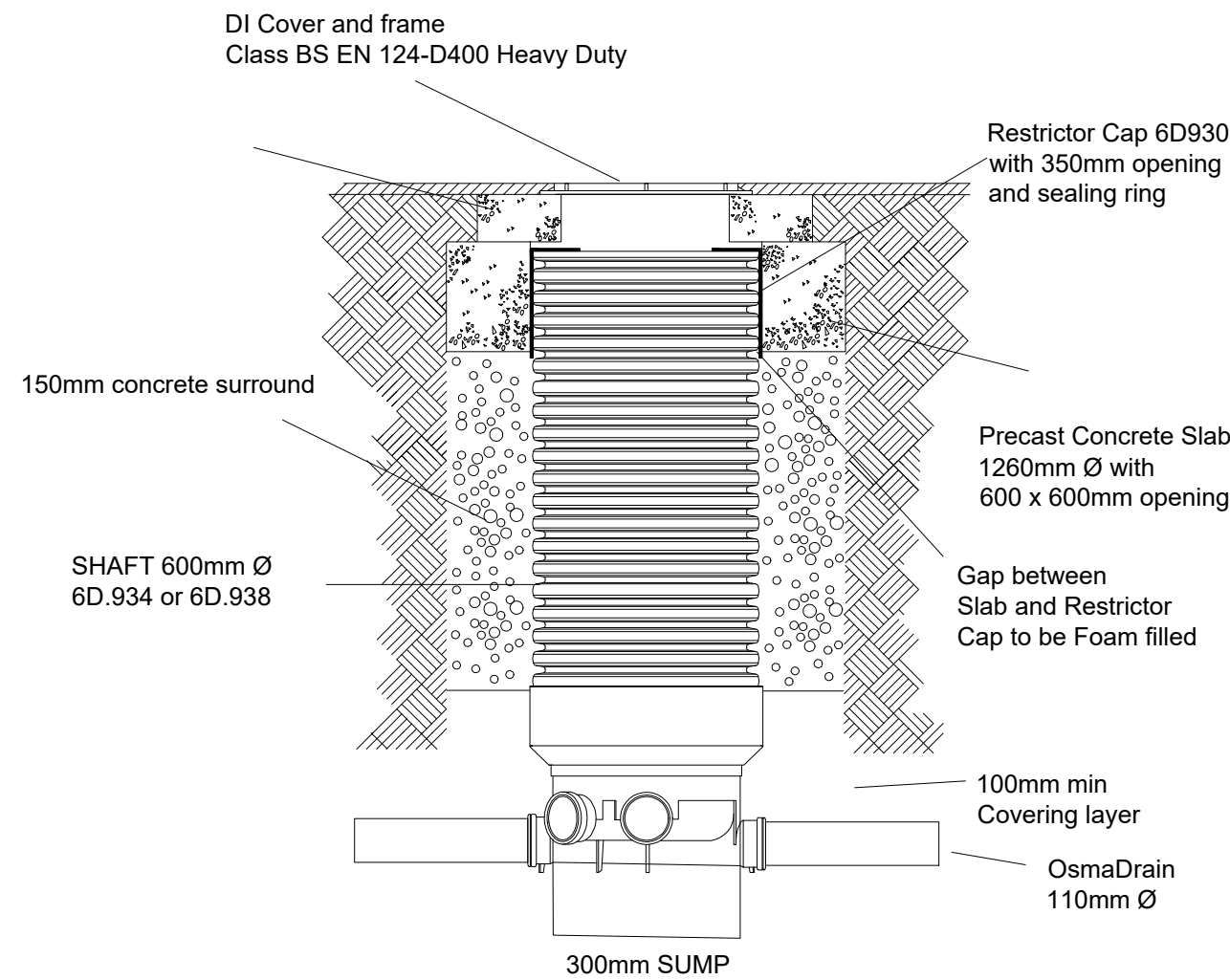
Title DRAINAGE ARRANGEMENT SHEET 1 OF 2

Drawing No. 16-3046-101

Revision P3

Scale 1:250 @ A1 Date AUGUST 2024

Drawn GRE Chk App



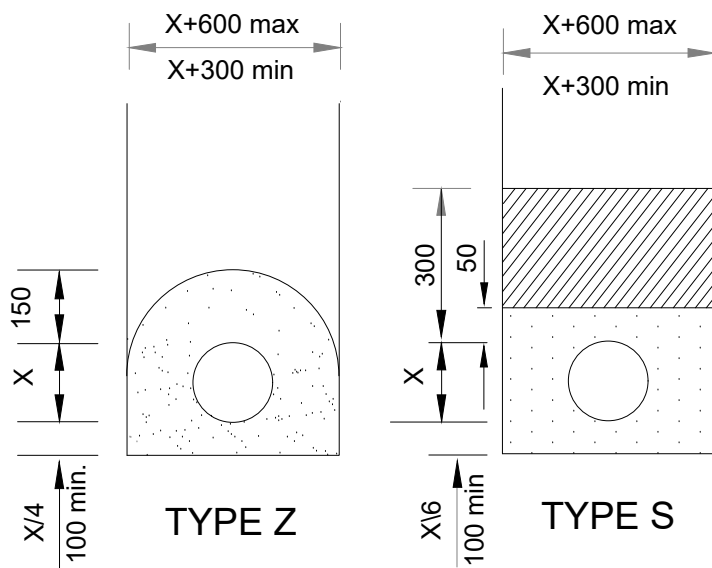
TYPICAL CATCHPIT
CHAMBER DETAIL

non entry

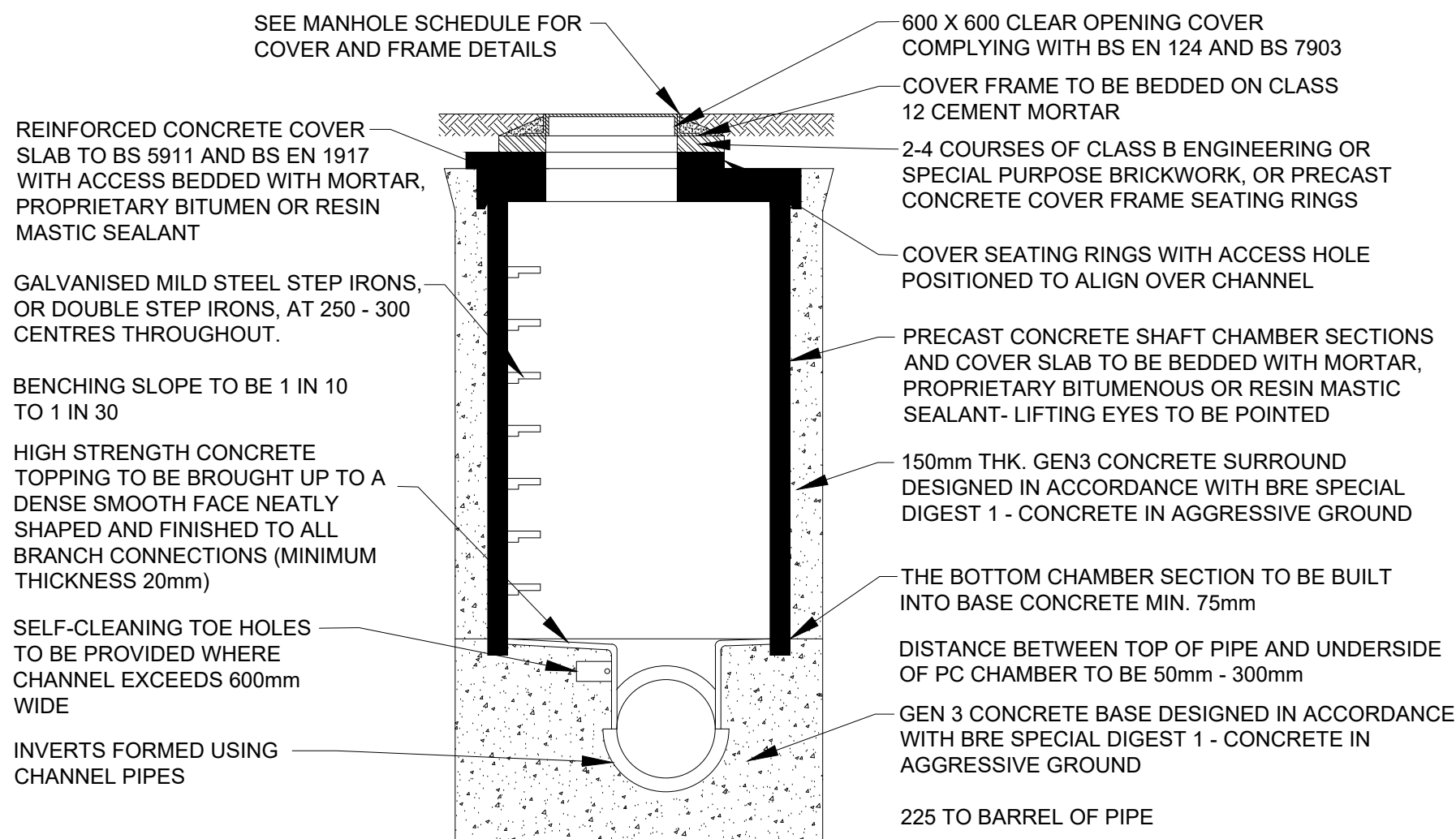
CONCRETE TO S.H.W
CLAUSE 503.3 (iii)

GRANULAR MATERIAL TO
S.H.W. CLAUSE 503.3 (i).

CLASS 8 MATERIAL TO
S.H.W CLAUSE 503.3 (iv)

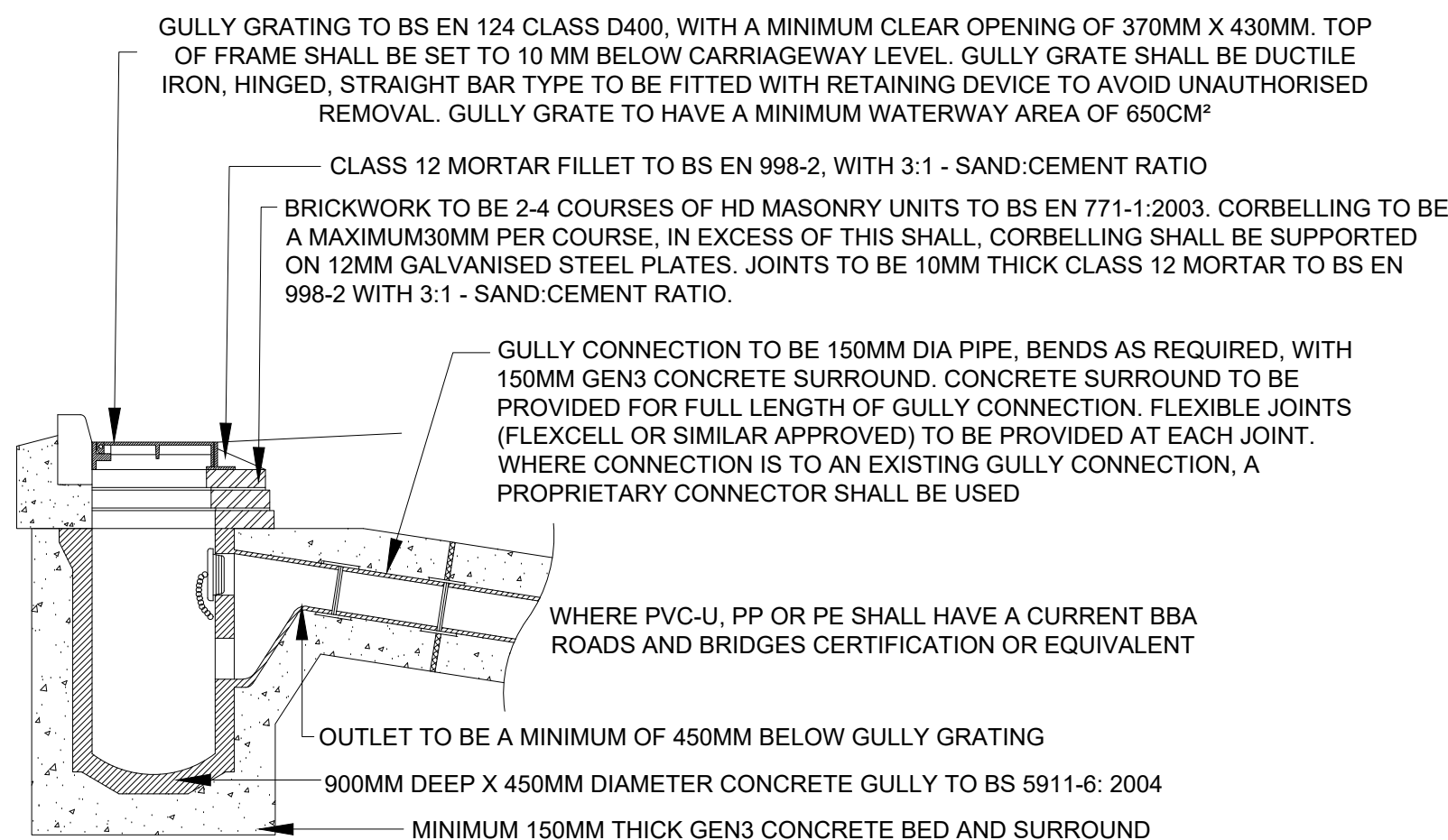


TYPICAL PIPE BED AND
SURROUND DETAIL

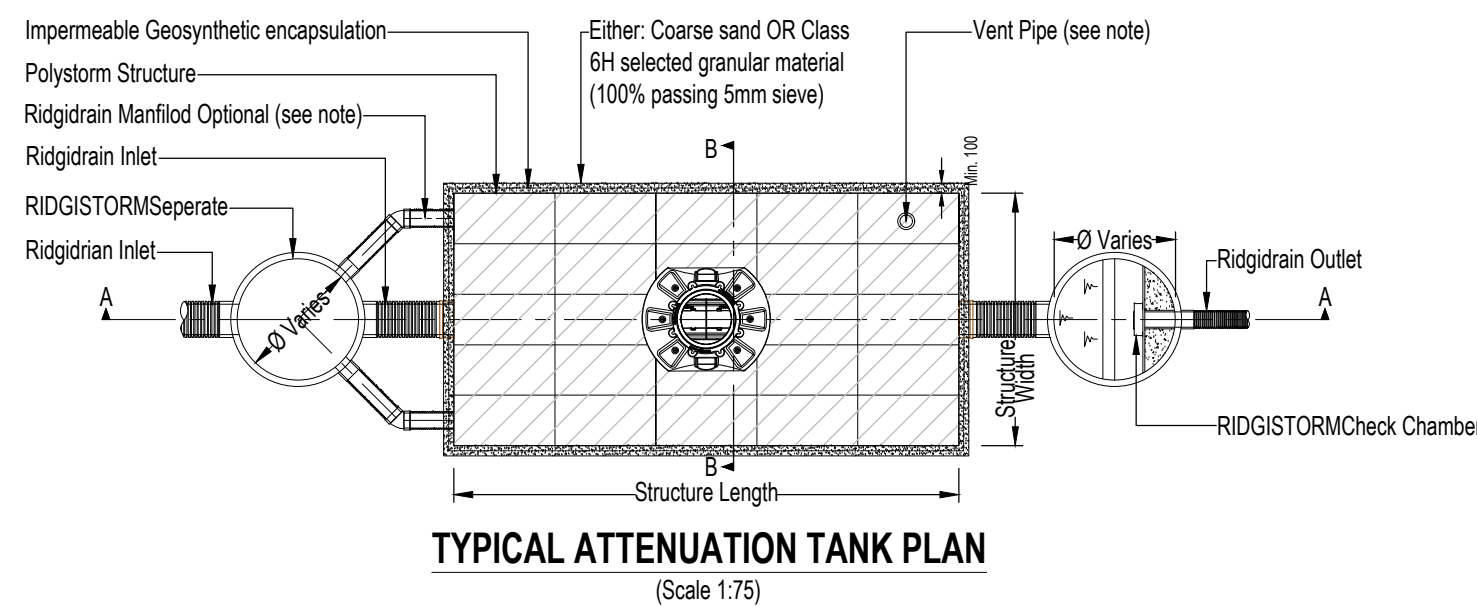


TYPICAL TYPE 2 CONCRETE
MANHOLE (PCC) DETAIL

MAX DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 0m - 3m

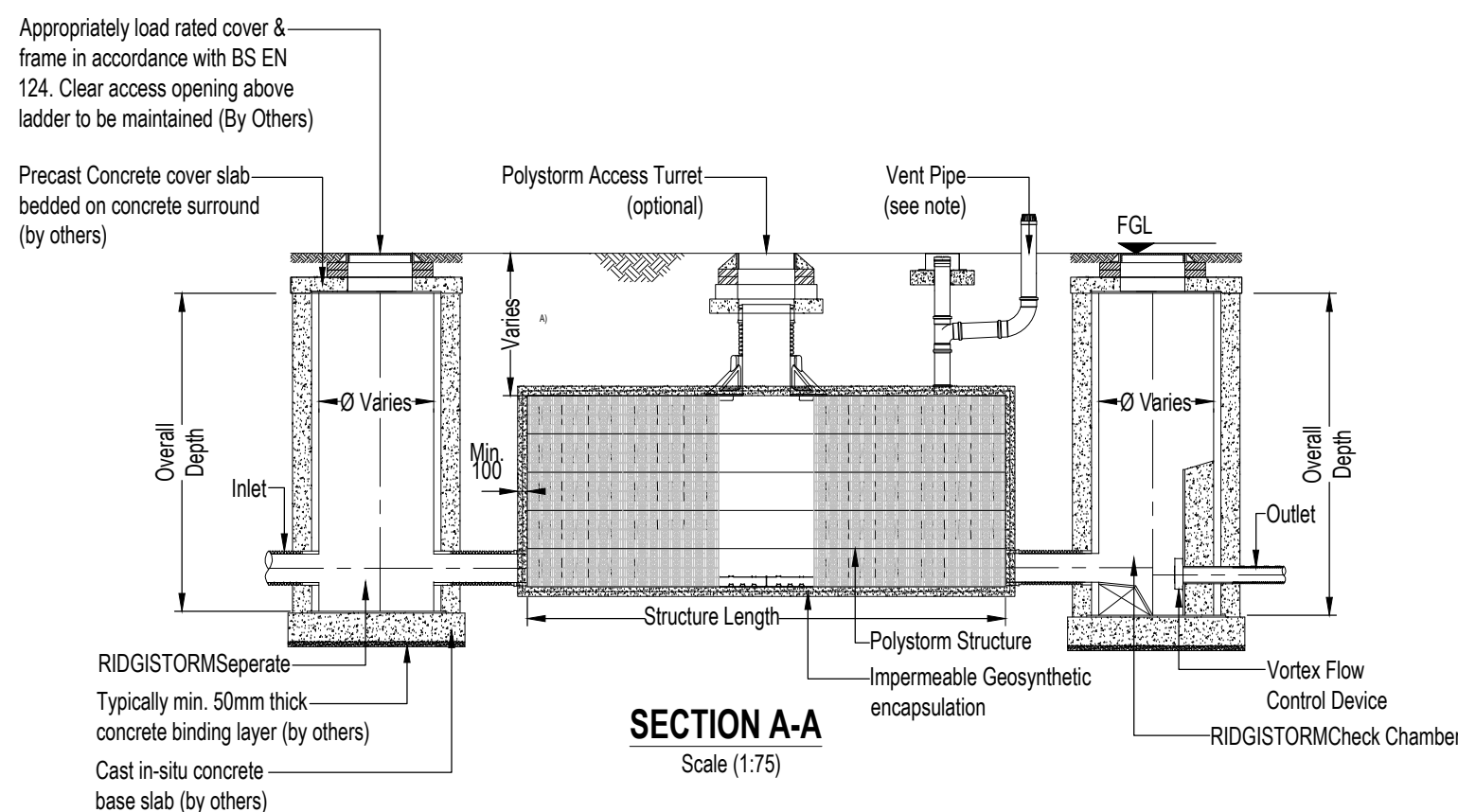


ROAD GULLY DETAIL



TYPICAL ATTENUATION TANK PLAN

(Scale 1:75)



SECTION A-A

Scale (1:75)

SECTION B-B

Scale (1:75)

TYPICAL POLYSTORM ATTENUATION DETAIL

P2	NOV 24	ATTENUATION DETAIL UPDATED	GRE	
P1	AUG 24	FIRST ISSUE	GRE	
Rev	Date	Revision Details	By	Chkd / Appd
Cora^{iHt}				
Client LIDL GREAT BRITAIN Ltd				
Project NEW HEY ROAD				
Title DRAINAGE ARRANGEMENT SHEET 2 OF 2				
Drawing No. 16-3046-101				Revision P2
Scale NTS		Date AUGUST 2024		
Drawn GRE	Chk Chk	App App		

APPENDIX B – POLYSTORM R INFORMAITON

POLYSTORM STORMWATER MANAGEMENT SYSTEMS

POLYSTORM-R GEOCELLULAR UNIT

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Polystorm-R Geocellular Unit, comprising polypropylene geocellular boxes, for use as below-ground water storage attenuation tanks or soakaways to manage stormwater run-off from impermeable surfaces.

(1) Hereinafter referred to as 'Certificate'.

The assessment includes

Product factors:

- compliance with Building Regulations
- compliance with additional regulatory or non-regulatory information where applicable
- evaluation against technical specifications
- assessment criteria and technical investigations
- uses and design considerations

Process factors:

- compliance with Scheme requirements
- installation, delivery, handling and storage
- production and quality controls
- maintenance and repair

Ongoing contractual Scheme elements†:

- regular assessment of production
- formal 3-yearly review



KEY FACTORS ASSESSED

- Section 1. Mechanical resistance and stability
- Section 2. Safety in case of fire
- Section 3. Hygiene, health and the environment
- Section 4. Safety and accessibility in use
- Section 5. Protection against noise
- Section 6. Energy economy and heat retention
- Section 7. Sustainable use of natural resources
- Section 8. Durability

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

On behalf of the British Board of Agrément

Date of Third issue: 24 July 2024
Originally certified on 16 April 2014



Hardy Giesler
Chief Executive Officer

This BBA Agrément Certificate is issued under the BBA's Inspection Body accreditation to ISO/IEC 17020. Sections marked with † are not issued under accreditation.

The BBA is a UKAS accredited Inspection Body (No. 4345), Certification Body (No. 0113) and Testing Laboratory (No. 0357).

Readers MUST check that this is the latest issue of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.

The Certificate should be read in full as it may be misleading to read clauses in isolation.

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

SUMMARY OF ASSESSMENT AND COMPLIANCE

This section provides a summary of the assessment conclusions; readers should refer to the later sections of this Certificate for information about the assessments carried out.

Compliance with Regulations

Having assessed the key factors, the opinion of the BBA is that the Polystorm-R Geocellular Unit, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations:



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

Requirement:	H3(3)	Rainwater drainage
Comment:		The system can contribute to satisfying this Requirement. See section 9 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The system is acceptable. See sections 8 and 9 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The system can contribute to satisfying this Regulation. See sections 8 and 9 and the Annex of this Certificate.
Regulation:	9	Building standards – construction
Standard:	3.6	Surface water drainage
Comment:		The system can contribute to satisfying this Standard, with reference to clauses 3.6.1 ⁽¹⁾⁽²⁾ to 3.6.5 ⁽¹⁾⁽²⁾ . See section 9 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
		(1) Technical Handbook (Domestic).
		(2) Technical Handbook (Non-Domestic).



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

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The system is acceptable. See sections 8 and 9 of this Certificate.
Regulation:	82	Rainwater drainage
Comment:		The system can contribute to satisfying this Regulation. See section 9 of this Certificate.

Additional Information

NHBC Standards 2024

In the opinion of the BBA, the Polystorm-R Geocellular Unit, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to NHBC Standards, Chapter 5.3 *Drainage below ground*.

Fulfilment of Requirements

The BBA has judged the Polystorm-R Geocellular Units to be satisfactory for use as described in this Certificate. The system has been assessed as a below ground water storage attenuation tank or soakaway to manage stormwater run-off from impermeable surfaces.

ASSESSMENT

Product description and intended use

The Certificate holder provided the following description for the system under assessment. The Polystorm-R Geocellular Unit (PSM1A) is modular unit, used in conjunction with clips, and shear and brick connectors which are used to secure the units together. The unit is manufactured from black recycled polypropylene (PP) and the connector from black PP.

The units have pre-formed sockets to enable connection with 160 mm diameter pipework (to BS EN 1401-1 : 2019), or alternatively, connection to 150 mm Ridgidrain, 110 mm or 100 mm pipework is possible using suitable adaptors.

The system has the nominal characteristics given in Table 1.

Table 1 Nominal characteristics of Polystorm-R Geocellular Unit

Characteristic (unit)	Value
Dimensions (mm) (L x W x H)	1000 x 500 x 400
Volume (m ³)	0.20
Storage volume (m ³)	0.19
Void ratio (%)	95
Mass (kg)	9

Ancillary Items

The following ancillary items are essential to use with the system and have been assessed with the system:

- Flange adaptor — to connect pipework with diameters other than a standard DN 160 inlet.

The Certificate holder recommends the following ancillary items for use within the system, but these materials have not been assessed by the BBA and are outside the scope of this Certificate:

- adaptor
- connecting pipework
- access/inspection provision
- outlet flow control device (orifice plate, vortex control or small pipe)
- project-specific geotextiles conforming
- project-specific geomembrane, and protective fleece
- adhesive or double-sided tape
- air vent connection
- silt trap or sediment removal separator.

Definitions for products and applications inspected

Geocellular units are thermoplastic cuboid shaped elements, with or without sidewalls, used to create a modular system made of repeating boxes.

The system is intended for use in the following situations:

- for a variety of areas, as defined in CIRIA C680 : 2008, Table 4.2:
 - landscape areas:
 - small gardens or landscaped areas with no vehicle access, such as soakaways for individual house roof drainage. When the system is installed below a garden, it should be a minimum of 5 m from the building and with minimum cover depth of 0.5 m
 - landscaped areas where drive-on mowers are used. Minimum cover depth is 0.5 m
 - trafficked areas such as driveways to individual houses, and car parks with height barriers to limit vehicle size with vehicles up to 3000 kg gross vehicle weight and, only occasionally, vehicles up to 9000 kg
- management of rainwater run-off from impermeable surfaces, as follows:
 - infiltration system (mostly wrapped in geotextiles) — water is stored within the system during rainfall and allowed to drain away by infiltrating into the surrounding ground over a substantial period after the rain has stopped
 - attenuation system (wrapped in geomembranes and/or geotextiles) — water is stored within the system during rainfall and released at a reduced flow rate through a flow-control device into an appropriate outfall. This reduces peak flows in the watercourse and, therefore, minimises the risk of flooding
 - a combination of infiltration and attenuation systems
 - rainwater harvesting (wrapped in geomembranes) — water is stored in the tank until required.

Any other applications are outside the scope of this Certificate.

Product assessment – key factors

The system was assessed for the following key factors, and the outcome of the assessments is shown below. Conclusions relating to the Building Regulations apply to the whole of the UK unless otherwise stated.

1 Mechanical resistance and stability

Data were assessed for the following characteristics.

1.1 Strength and stability

1.1.1 Results of short-term compression tests are given in Table 2.

Table 2 Characteristics for strength and stability			
System assessed	Assessment method	Requirement	Result
Unit	Short-term compression strength (as ultimate strength) to BBA Method	Value declared	Vertical: 610 kN·m ⁻² Lateral: 63 kN·m ⁻² Vertical: 1 mm per 60.0 kN·m ⁻² Lateral: 1 mm per 4.4 kN·m ⁻²

1.1.2 On the basis of data assessed, the system is deemed to be fit for purpose for resistance to soil load including traffic load, both during and after installation.

1.1.3 The short-term compression results must not be used to derive design strength directly. Ultimate strength is the maximum recorded strength or the resistance recorded at strain amplitude of 6%, whichever occurs first.

1.1.4 The partial load and material factors defined in CIRIA C680 : 2008, Tables 4.5 and 4.6, may be used in an ultimate limit state design. Where applicable, additional factors must be considered for dynamic and material factors for creep/fatigue.

2 Safety in case of fire

Not applicable.

3 Hygiene, health and the environment

Not applicable.

4 Safety and accessibility in use

Not applicable.

5 Protection against noise

Not applicable.

6 Energy economy and heat retention

Not applicable.

7 Sustainable use of natural resources

The system is manufactured from polypropylene, which can be recycled.

8 Durability

8.1 The potential mechanisms for degradation and the known performance characteristics of the materials in the system were assessed.

8.2 Specific test data were assessed for the following.

Table 3 Characteristics for durability			
System / product assessed	Assessment method	Requirement	Result
Unit	Long-term deflection to BBA Method	Declared equation for deflection at defined load at 20°C	Equation for vertical deflection: $0.2798 \ln [\text{time (hours)}] + 0.4855$ for loads up to $162 \text{ kN}\cdot\text{m}^{-2}$ Equation for lateral deflection: $1.0191 \ln [\text{time (hours)}] + 3.8674$ for loads up to $31 \text{ kN}\cdot\text{m}^{-2}$
Polypropylene material	Resistance to chemicals to BS EN 13476-1 : 2018, A.3 For guidance: PD ISO/TR 10358 : 2021	System used for rainwater management	Pass

8.2.1 The equations have been established from creep tests. These can be used to estimate the long-term deflection for periods up to 60 years at 20°C.

8.2.2 On the basis of data assessed, the system is deemed to be suitably resistant to soil and traffic loads, both during and after installation, as well as to the chemicals with which it is likely to come into contact in service.

8.2.3 The system has suitable resistance to the chemicals likely to be encountered in service, subject to the water discharged being rainwater, surface water or ground water, excluding chemically contaminated wastewaters, such as industrial discharges. In situations where the system is to be exposed to the excluded influents, specific chemical and temperature resistance must be taken into account by a suitably experienced and competent individual.

8.3 Service life

Under normal service conditions, the system will have a life up to 60 years, provided it is designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

PROCESS ASSESSMENT

Information provided by the Certificate holder was assessed for the following factors:

9 Design, installation, workmanship and maintenance

9.1 Design

9.1.1 The design process was assessed by the BBA, and the following requirements apply in order to meet the performance assessed in this Certificate:

Guidance on the design and application of Sustainable Drainage Systems (SUDS) must be followed as given in:

- the Certificate holder's design recommendations
- CIRIA C680 : 2008 and CIRIA C753 : 2015
- flood risk and coastal change guidance.

9.1.2 The design of each project must be preceded by a detailed audit of the proposed site to establish:

- existing factors and considerations applicable to the site (eg soil type, presence of groundwater)
- predicted factors relating to the site's use following the planned development, and the parameters within which the installation is required to function (eg depth cover, surface finishing, type of loading)
- the type of function of application suggested by the audit.

9.1.3 Once the specific project criteria have been established from the site audit, the following design criteria must be established:

9.1.3.1 Hydraulic design

9.1.3.1.1 The outflow from the tank must be controlled to comply with the discharge-rate consent of the site. If the anticipated design flow is greater than the hydraulic capacity of a single connection pipe, the flow may be split between a number of pipes from an adjacent manhole. The system designer must ensure that the number and size of the pipe connections is sufficient to convey the anticipated design flow without restriction.

9.1.3.1.2 For infiltration (soakaways) application, either CIRIA Report 156 : 1996 or BRE Digest 365 : 2016 calculations must be followed. In addition, the soil underlying the installation must have adequate permeability and the seasonally high-water table must be a minimum of 1 m below the base of the installation.

9.1.3.1.3 For attenuation (storage) application, the anticipated total run-off volume from the site must be estimated in the calculation, using the Wallingford Procedure or other acceptable method. The allowable discharge rate from the site to an appropriate outfall must be established, but will normally be set by the Environment Agency, Scottish Environmental Protection Agency or Planning Authorities. Furthermore, for sites with a groundwater or high-water table, susceptibility of the tank to float must be taken into consideration.

9.1.3.2 Structural design

9.1.3.2.1 The structural design of each installation incorporating the system must be carried out by a suitably experienced and competent engineer.

9.1.3.2.2 Consideration must be given to the effects of cumulative deflection in systems comprising several layers of units, and care must be taken when the system is used below trafficked areas and close to structures. It is important to ensure that the infiltrating water will not soften the soils or cause loss of fines and subsequent settlement.

9.1.3.2.3 The engineer responsible for the design of the installation must confirm that the allowable ground-bearing capacity at the formation level is sufficient for the proposed operational loads. In areas of weak or compressible soils, advice should be sought from a geotechnical engineer, but such advice is outside the scope of this Certificate.

9.1.3.2.4 When the tank is wrapped in an impermeable geomembrane and placed below the groundwater table, flotation may occur. To prevent this, the weight of the soil over the top of the unit must be greater than the uplift force caused by the unit's buoyancy in the water. This can be achieved with most types of fills if the depth of cover fill is equal to, or greater than, the depth of penetration of the units below groundwater level.

9.2 Installation

9.2.1 Installation instructions provided by the Certificate holder were assessed and judged to be appropriate and adequate.

9.2.2 Installation must be carried out in accordance with this Certificate and the Certificate holder's instructions. A summary of instructions and guidance is provided in Annex A of this Certificate.

9.2.3 To achieve the performance described in this Certificate, the system must be installed and tested in accordance with PD CEN/TR 17179 : 2018 and CIRIA C680 : 2008.

9.2.4 Special attention must be paid to temporary work requirements in excavations. The base must be inspected for soft spots in the formation, and any present must be excavated and replaced with compacted granular fill material. The construction of final cover layers, such as concrete, bituminous or blockwork surfacing, and other finishes must be delayed as much as possible.

9.2.5 Adequate venting must be provided to the tank, either through high level pipe connections, direct venting to the atmosphere or via access chambers. One 110 mm diameter air vent is required per 7500 m² impermeable catchment area to be drained.

9.3 Workmanship

Practicability of installation was assessed by the BBA, on the basis of the Certificate holder's information. To achieve the performance described in this Certificate, installation of the system must be carried out by a competent general builder, or a contractor, experienced with this type of system.

9.4 Maintenance and repair

9.4.1 Ongoing satisfactory performance of the system in use requires that it is suitably maintained. The guidance provided by the Certificate holder was assessed by the BBA and found to be appropriate and adequate.

9.4.2 The following requirements apply in order to satisfy the performance assessed in this Certificate:

The owner of the structure is responsible for its maintenance. For soakaways to individual houses, the only necessary maintenance of the tank is to keep all gullies clear of debris. For large installations or where the receiving waters are environmentally sensitive, a programme of regular inspections and cleaning of all traps and sumps must be established to prevent siltation of the tank and to ensure its correct performance. Paved surface areas above an installation must be inspected at the same time to ensure they continue to provide the required structural support. The tank must also be inspected after every major storm event.

10 **Manufacture**

10.1 The production processes for the system have been assessed, and provide assurance that the quality controls are satisfactory according to the following factors:

10.1.1 The manufacturer has provided documented information on the materials, processes, testing and control factors.

10.1.2 The quality control operated over batches of incoming materials has been assessed and deemed appropriate and adequate.

10.1.3 The quality control procedures and system testing to be undertaken have been assessed and deemed appropriate and adequate.

10.1.4 The process for management of non-conformities has been assessed and deemed appropriate and adequate.

10.1.5 An audit of each production location was undertaken, and it was confirmed that the production process was in accordance with the documented process, and that equipment has been properly tested and calibrated.

†10.2 The BBA has undertaken to review the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

11 Delivery and site handling

11.1 The Certificate holder stated that the system is delivered to site in packaging bearing the Certificate holder and system name, system code, date of manufacture, job number and the BBA logo incorporating the number of this Certificate. The units are supplied in stacks of 15 units secured to a wooden pallet, with appropriate number of clips, shear connectors and brick bonds.

11.2 Delivery and site handing must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

11.2.1 Requirements for transportation, handling, and storage at depots and sites in accordance with PD CEN/TR 17179 : 2018.

11.2.2 The pallets must be carefully placed on level ground and must not be stacked on site.

11.2.3 The system must be protected from direct sunlight if long-term storage is envisaged.

11.2.4 The system is resistant to damage that could occur with normal handling. However, it must be stored in locations where impact from vehicles and other construction plant activities will be avoided.

11.2.5 Prior to installation, all components of the system must be checked for damage. Damaged or defective components must not be installed.

Supporting information in this Annex is relevant to the system but has not formed part of the material assessed for the Certificate.

Construction (Design and Management) Regulations 2015

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

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

Management Systems Certification for production

The management system of the manufacturer has been assessed and registered as meeting the requirements of ISO/IEC 9001 : 2015, ISO/IEC 14001 : 2015 and ISO/IEC 45001 : 2018 by BSI (Certificates Q06225, EMS 535794 and OHS 73211 respectively) and ISO/IEC 9001 : 2015 by BSI (Certificate Q06391).

Additional information on installation

A.1 The hole or trench is excavated to the required depth, dimensions and levels. It must be ensured that the plan area is sufficient (minimum 500 mm is recommended) to allow access around the tank to compact backfill material. The base must be smooth and level without sharp drops or humps. Slopes must be cut to a safe angle or adequately supported, and safe access must be provided to allow personnel to enter the excavation. Excavation must be carried out in accordance with BS 6031 : 2009, with particular attention paid to safety procedures.

A.2 The impermeable geomembrane (and geotextile and fleece, if additional protection is required) in the attenuation system and geotextile in the infiltration system are laid over the sand bedding layer and up the sides of the excavation. Joints between adjacent sheets of impermeable membrane must be sealed correctly using proprietary techniques recommended by the manufacturer and in line with PD CEN/TR 17179 : 2018. Jointing with tape is not recommended as the seal becomes reliant on the mechanical properties of the tape to maintain its integrity. The geomembrane is inspected for damage and all welds are tested as required.

A.3 The main unit is mounted onto the bottom plate; a proper connection is ensured through a 'click' sound. The next pre-mounted units are installed in the correct orientation (white circles in line) by sliding the integrated connectors into each other. In the next layers, positioning the white circles above each other is not possible. Side panels are installed by inserting hinge pins into the hinge pockets.

A.4 Drainage connections are made to the installation using proprietary adaptors. Pre-formed socket positions for pipe connections must be located at the correct position for receiving pipework. Alternatively, flange adaptors attached to the units with adhesive tape and self-tapping screws are used (flange adaptors cannot be used at the invert of the units into the pre-formed socket). It is recommended that all connections into air vent and storage applications (using a geomembrane) are made using a flange adaptor. Adhesive or double-sided tape must be used between the geomembrane and flange adaptor to ensure a watertight seal. Alternatively, drainage connections are sealed into a pre-formed socket using proprietary seals approved by the geomembrane manufacturer.

A.5 The installation is backfilled with Type 1 or 2 sub-base or Class 6P (side fill only) selected granular material in accordance with the *Manual of Contract Documents for Highway Works* (MCHW), Volume 1 *Specification for Highway Works* (SHW). The backfill is compacted in 150 mm thick layers.

A.6 A coarse sand protection layer, 100 mm thick, should be placed over the top of the units that have been wrapped. Backfilling is continued with:

- trafficked areas (eg car parks) — Type 1 or 2 sub-base material compacted in 150 mm layers in accordance with the MCHW, Volume 1. The mass of compaction plant over the top of the units must not exceed 2300 kg per metre width of roll
- landscaped and non-trafficked areas — selected as-dug material, with size of pieces less than 75 mm, compacted to 90% maximum dry density.

Additional information on maintenance

A.7 It is recommended that a silt trap or sediment-removal separator is installed upstream of the inlet pipework to the system, and access (via manhole or similar) to the location of flow control devices is incorporated.

A.8 Further guidance on operation and maintenance of the installation may be obtained from CIRIA C753 : 2015.

Bibliography

BRE Digest 365 : 2016 *Soakaway Design*

BS 6031 : 2009 *Code of practice for earthworks*

BS EN 1401-1 : 2019 *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U) — Specifications for pipes, fittings and the system*

BS EN 13476-1 : 2018 *Plastics piping systems for non-pressure underground drainage and sewerage — Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — General requirements and performance characteristics*

ISO/IEC 9001 : 2015 *Quality management systems — Requirements*

PD CEN/TR 17179 : 2018 *Thermoplastics piping and ducting systems — Rainwater infiltration and storage attenuation systems — Practices for underground installation (02/20)*

PD ISO/TR 10358 : 2021 *Plastics pipes and fittings for industrial applications — Collection of data on combined chemical-resistance*

CIRIA C680 : 2008 *Structural design of modular geocellular drainage*

CIRIA C753 : 2015 *The SuDS Manual*

CIRIA Report 156 : 1996 *Infiltration drainage — Manual of good practice*

Flood risk and coastal change guidance — *National Planning Policy Framework — August 2022*

ISO/IEC 14001 : 2015 *Environmental Management Systems — Requirements with guidance for use*

ISO/IEC 45001 : 2018 *Occupational health and safety management systems — Requirements with guidance for use*

Manual of Contract Documents for Highway Works (MCHW), Volume 1 *Specification for Highway Works*, Series 0500, *Drainage and Service Ducts (02/20)*

Conditions

1 This Certificate:

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

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

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

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

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

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

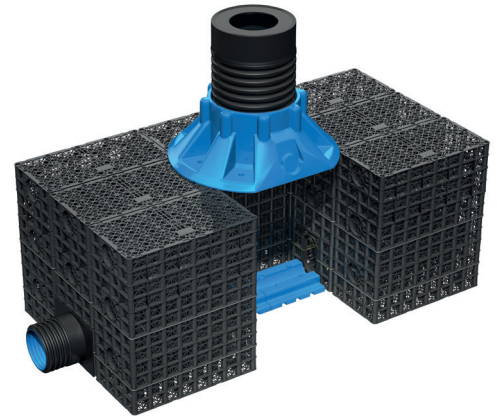
- the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product
- actual installations of the product, including their nature, design,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

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

Polystorm Access provides a 1m x 0.5m shaft within a Polystorm geocellular structure to enable surface access for remote camera inspection and maintenance activities, such as flushing and rodding.

The system consists of a 500mm diameter shaft which extends from surface level to the top of a Polystorm structure, at which point a turret provides an interface between the shaft and the inspection chamber within the Polystorm structure. At the bottom of the chamber, a base unit interlocks with the surrounding layer of Polystorm cells whilst supporting the geomembrane. A 350mm reduced access shaft cap is provided to comply with inspection chamber regulations.

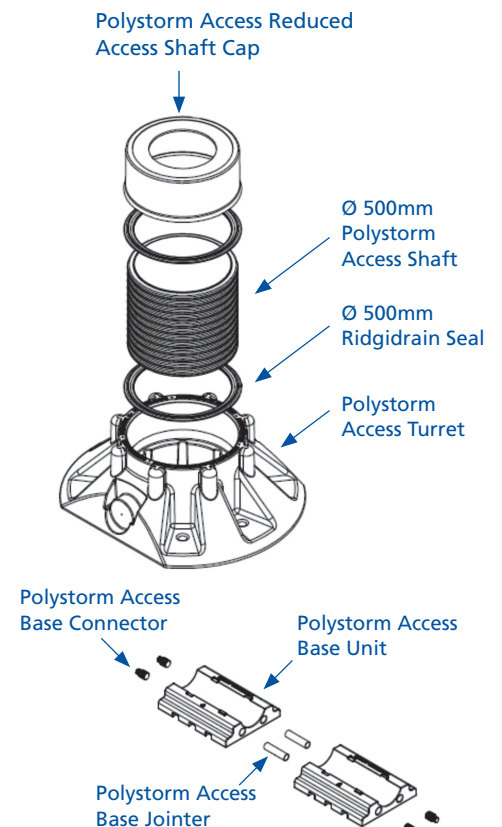
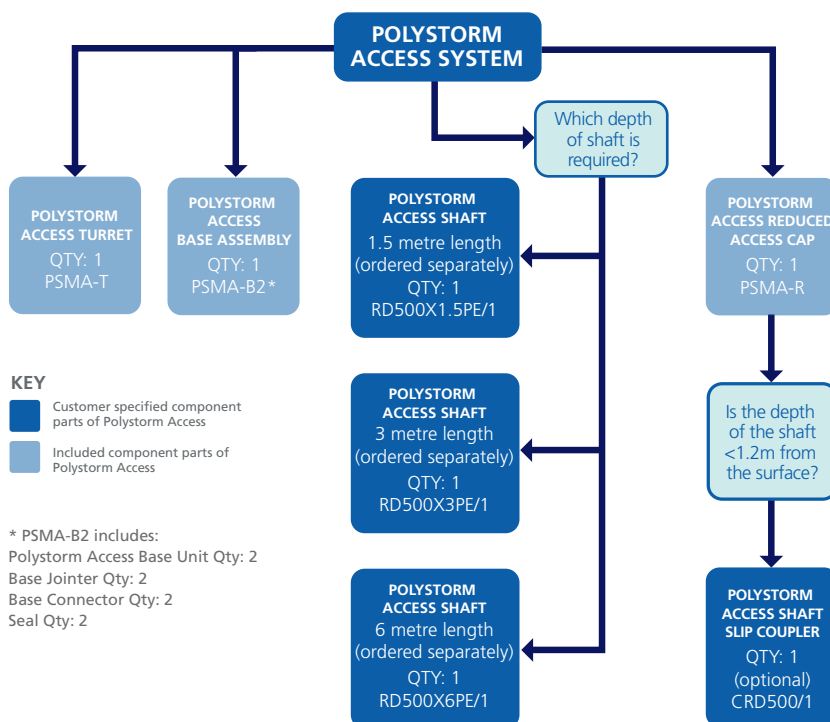
Polystorm Access is suitable for use with Polystorm, Polystorm-R, Polystorm Lite and Polystorm Xtra and may be combined with Polystorm Inspect for full length remote inspection and maintenance.



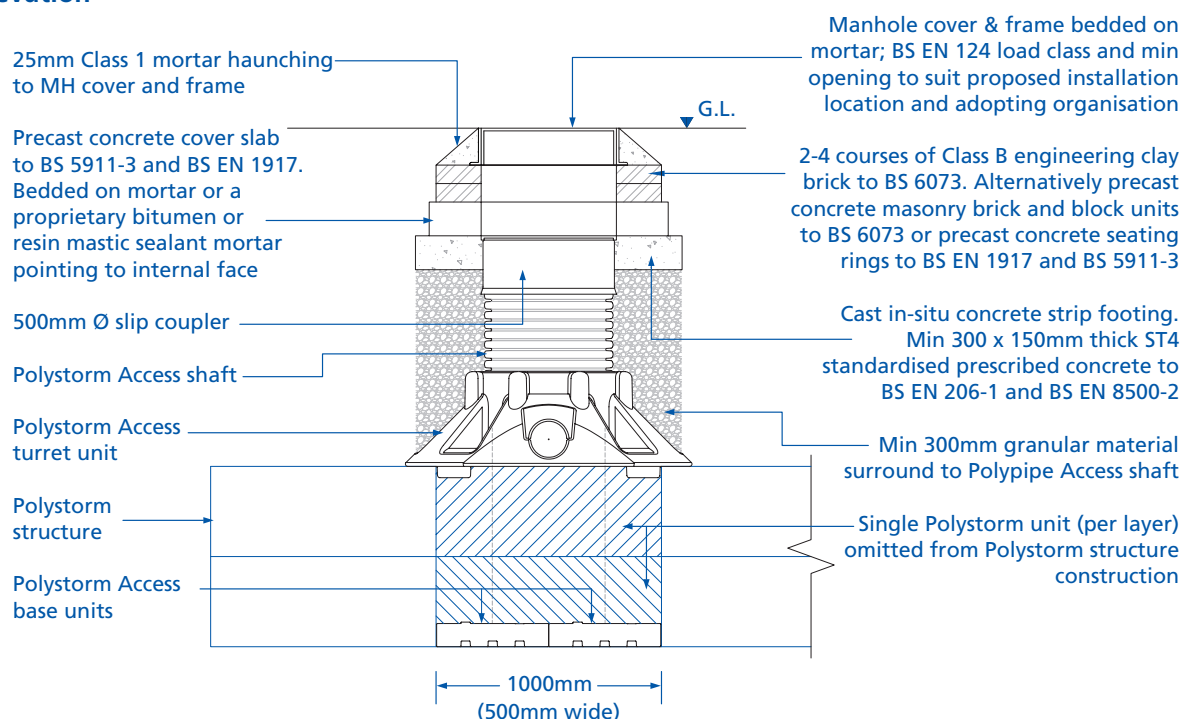
Please note: The Polystorm Access turret and base assembly are black. They are shown blue for illustration purposes.

Key Benefits

- Meets minimum 450mm width requirement for inspection chamber access, with 350mm reduced access where regulations dictate
- Integrated solution; can be used with Polystorm Inspect to monitor internal volume of geocellular structure
- Base unit provides smooth transition between Polystorm Inspect units
- Multiple inspection configurations can be achieved when used in conjunction with Polystorm Inspect
- Manufactured from polyethylene for light weight, ease of handling and high strength
- Sustainability: All components 100% recyclable after use



Typical Elevation



Please note: Above is a typical installation detail for a Polystorm tank with groundwater below the base of the unit. For installation with groundwater above the structure invert please contact our Technical Team on **+44 (0) 1509 615100** or email **civils@polypipe.com**

Polypipe Plastics Expertise

Polystorm Access is manufactured from sustainable polyethylene using the proven rotational moulding technique.

Reliability and Performance

All components in the Polystorm Access system have a design life of up to 50 years where ground conditions allow.

Easy Handling and Installation

Components are light and easy to handle, reducing health and safety risks and speeding up installation. The Polystorm Access shaft can be quickly and accurately cut to the right depth from 500mm Ridgidrain pipe, adding to the ease and flexibility on-site.

Nominal Weights

PSMA-B2 = 8kg PSMA-T = 19kg PSMA-R = 4kg

Flexible Positioning

The Polystorm Access turret can be positioned anywhere on a Polystorm structure, providing there are two or more Polystorm cells between the access turret and the structure edge.

The Polystorm Access shaft is variable in length depending on the depth you require.

Features

- 1m x 0.5m inspection chamber within Polystorm structure
- 500mm riser shaft from surface to top of Polystorm structure
- Riser shaft may be extended as required using 500mm Ridgidrain pipe and seals
- It is recommended that the 500mm Ridgidrain pipe access shaft is within the limits of 250-1050mm for a typical installation
- Reduced Access shaft cap (350mm) available where required by regulations
- Full system 100% recyclable
- Choice of standard shaft lengths

Technical Support

Detailed guidance and assistance is available.

For further information, please contact our Technical Team on **+44 (0) 1509 615100** or email **civils@polypipe.com** or visit **www.polypipe.com/civils-technical-hub**

Polystorm Access can be utilised in these SuDS techniques

TECHNIQUES													
Blue-Green roofs	Podium Decks	Trees	Sports Pitches	Cycle Paths	Permeable Paving (sub base & podium)	Bioretention & Rain Gardens	Attenuation Storage Tanks	Infiltration	Swales	Filter Drains	Detention Basins	Ponds & Wetlands	Filter Strips
			✓			✓	✓	✓	✓	✓	✓	✓	

Visit www.polypipe.com/greeninfrastructure

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5.4 Typical installation procedure

- soakaway

5.4.3 Polystorm cell installation

Place the Polystorm cells on the geotextile in accordance with the construction drawings and Polypipe connection details. Ensure cells are arranged so that they are in the correct alignment with the adjoining pipework (see pages 54 & 55).

5.4.4 Shear connection

Vertical connections are formed with the Polypipe shear connector (see pages 54 & 55).

5.4.5 Clip connectors

Polypipe clips connect horizontally adjacent cells (see pages 54 & 55).

5.4.6 Polystorm cell connections

Pipe Connections

160mm EN 1401-1 pipes connect directly into the convenient knock-out incorporated in the end of each cell. Connection to 110mm EN 1401-1 pipes or other products is accommodated through the use of standard Polypipe adapters. Polystorm cells are also available with either a 225mm or 300mm fabricated Rigidrain pipe connection (see pages 56 & 57).

5.4.7 Encasing geotextile

Complete the geosynthetic encapsulation of the entire Polystorm structure, forming joints where appropriate. Re-examine the geomembrane and/or geotextile for damage and joint integrity.

5.4.8 Lateral backfilling

Backfill around the sides of the encapsulated cells, forming a 100mm thick layer of coarse sand or Class 6H selected granular material immediately adjacent to the cells. Where required, remaining excavated areas around the cells should be backfilled with Class 6N or 6P selected granular material, in accordance with MCHW, Volume 1, or similarly approved specification.

5.4.9 Cover backfilling

Backfill around the sides of the encapsulated cells, forming a 100mm thick layer of coarse sand or Class 6H selected granular material immediately adjacent to the cells.

Where required, remaining excavated areas around the cells should be backfilled with Class 6N or 6P selected granular material, in accordance with MCHW, Volume 1, or similarly approved specification.

Above the wrapped Polystorm cells, place and lightly compact a minimum 100mm thick layer of either coarse sand or Class 6H selected granular material (with 100% passing the 5mm sieve), in accordance with MCHW, Volume 1, Series 600.

Final backfilling of the installation and surfacing is dependent on the expected operational loads. (NB Compaction plant over and immediately adjacent to the Polystorm cells shall not exceed 2300 kg/m width).

5.4.10 Field conditions (e.g. landscaped areas)

The backfill material that lies within 300mm above the Polystorm cells should be free from particles exceeding 40mm in diameter, in accordance with Class 8 material to Series 600, Volume 1, MCHW. Final backfilling up to finished ground level may be achieved using selected as-dug material. Backfill material should be placed and compacted in layers no greater than 300mm, or in compliance with the approved specification.

5.4.11 Lightly trafficked (e.g. restricted access car park)

Backfill with Class 1 or 2 material in accordance with MCHW, Volume 1, Series 600. Backfill material should be placed and compacted in layers not greater than 150mm. Where the Polystorm cells are installed beneath a paved area, the pavement sub-base may form part of the backfill material provided that minimum cover depths are maintained. Complete pavement construction or landscaping over the Polystorm system.

5.4.12 Inspection

After installation and prior to handover, any silt collection chambers or control manholes should be examined to ensure they are free from debris or contamination.

5.5 Maintenance

5.5.1 Maintenance

The customer is responsible for maintenance

For soakaways to individual houses, the only necessary maintenance of the system is to keep gullies clear of debris such as leaves. For large installations or where the receiving waters are environmentally sensitive, a system of regular inspections should be established to prevent siltation of the system which, if allowed to develop, would reduce effectiveness. They should also be inspected after every major storm event.



It is recommended that a silt trap is incorporated into the pipework at the inlet to the tank (see Figure 47) there must be a maintenance plan that ensures regular cleaning of the trap to ensure correct performance.

Note: To download Auto CAD drawings and BBA certificates please visit www.polypipewms.co.uk.

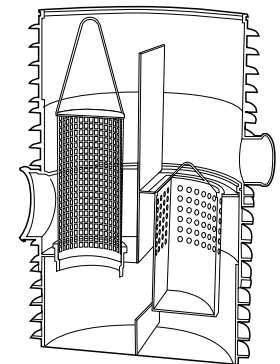
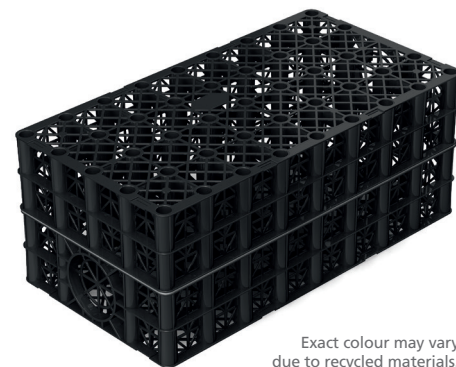


Figure 47

Product code: PSM1A

The Polystorm-R modular cell is ideally suited for loaded applications at greater depths, such as housing, commercial and infrastructure projects and has a compressive strength of up to 61 tonnes/m². It offers all the proven performance of the Polystorm cell, with the added benefits of being manufactured from over 90% recycled material content.

Wherever performance criteria and standards allow, we will always maximise the sustainability of our products by using post consumer plastics in their manufacture. By sourcing and carefully controlling the quality of the recycled material we use our precision injection moulding. Therefore we are able to guarantee consistent quality in our recycled plastic, giving you the confidence and the performance levels you expect from the market leader.



Exact colour may vary due to recycled materials.

Applications

The Polystorm-R modular cells are combined to form a structure that receives rainwater collected from roofs of surface drains. The rainwater is then either attenuated by the structure, when wrapped in an impermeable membrane, or infiltrated by the structure, when wrapped in a permeable geotextile.

Key Benefits

- Made from specially selected and controlled recycled materials
- Environmentally friendly, sustainable solution
- Has undergone stringent testing to ensure product performance
- Compressive strength of 61 tonnes/m²
- Ideal for retention, attenuation and infiltration applications with a suitable geomembrane or geotextile
- Designed for trafficked and loaded applications
- BBA approved
- Visual and maintenance access can be achieved when used in conjunction with Polystorm Access & Inspect
- Allow flexibility of shape – ideal for shallow excavation systems, narrow strips or use in restricted areas
- Can be used as part of a value engineered hybrid system with Polystorm, Polystorm Lite and Polystorm Xtra
- Integrated inlet and outlet
- 3D flow throughout the structure
- 95% void ratio
- Light in weight yet robust – excellent Health & Safety and installation benefits
- 100% recyclable
- 60 years creep limited life expectancy

ELEMENT

VALUE

PHYSICAL PROPERTIES

Length	1m
Width	0.5m
Depth	0.4m
Total volume	0.2m ³
Unit weight	9kg
Unit storage volume	0.19m ³ (190 litres)
Void ratio	95%

SHORT TERM COMPRESSIVE STRENGTH

Vertical	Maximum 610 kN/m ² *
Lateral	Maximum 63 kN/m ² *

SHORT TERM DEFLECTION

Vertical	60 kN/m ² per mm
Lateral	4.4 kN/m ² per mm

Note: Polystorm-R is ideal for use in trafficked and pedestrian applications subject to a structural design check and suitable installation conditions

Each unit includes 4 Clips and 2 Shear Connectors.

* Compressive strength at yield, maximum recommended value for design purposes.



RECOMMENDED MAXIMUM DEPTH OF INSTALLATION (to cell invert) [m]

TYPICAL SOIL TYPE	TYPICAL ANGLE OF SHEAR RESISTANCE	SOIL WEIGHT kN/m ³	WITHOUT GROUNDWATER (below base of cells) NORMAL CASE		WITH GROUNDWATER AT 1M BELOW GROUND LEVEL AND UNITS WRAPPED IN GEOMEMBRANE	
			Pedestrian	Trafficked (cars) <3000kg GVW	Pedestrian	Trafficked (cars) <3000kg GVW
Stiff over consolidated clay e.g. London clay	24	20.0	2.2	1.9	1.8	1.6
Normally consolidated silty sandy clay e.g. alluvium, made ground	26	19.0	2.4	2.2	1.9	1.7
Loose sand and gravel	30	18.0	3.0	2.7	2.0	1.9
Medium dense sand and gravel	33	19.0	3.2	2.9	2.0	1.9
Dense sand and gravel	38	20.0	3.7	3.5	2.1	2.0

Note:

1) Stated depths based on the calculation methodology detailed within CIRIA C680 (2008)

2) Assuming water density = 10.0kN/m³

3) Assumed ultimate limit state (ULS) partial factor of safety applied to: Material = 2.75 Lateral pressure = 1.35

Durability

Wherever allowable we maximise the sustainability of our product by using post-consumer plastics in their manufacture. By carefully sourcing and controlling the quality of the recycled material we are able to guarantee the consistency of our recycled products. The polymer material used in the manufacture of the Polystorm-R unit has an adequate resistance to attack from the type and quantities of chemicals that may be expected to naturally occur in uncontaminated soils and rainwater run-off. When installed in accordance with our recommendations, it is expected that the Polystorm-R unit will have a design life in excess of 60 years*. The installer of a proposed geocellular structure should ensure that an appropriate design check has been undertaken, in accordance with the recommended methodology and factors of safety given in CIRIA C680 (2008), Structural Design of Modular Geocellular Drainage Tanks, prior to the commencement of construction activities.

* Derived from long term extrapolated creep testing

Notes

1. Unless stated, all values are nominal and may vary within normal production tolerances.
2. The characteristic unit parameters stated have been based on Polypipe BBA certificate N° 06/4297, sheet 3.
3. Polypipe reserve the right to change product specifications without prior notice.
4. This document is uncontrolled and updates will not be issued automatically.

RECOMMENDED MINIMUM COVER LEVELS [m]

LIVE LOAD CONDITIONS	PEDESTRIAN	LIGHT TRAFFICKED	
		Car park with vehicle mass <GVW	
Minimum cover depth required (m)	0.50	<3000kg 0.50	<9000kg 0.65

Note

1) Stated depths based on the calculation methodology detailed within CIRIA C680 (2008)

2) Assumed serviceability limit state (SLS) partial factor of safety applied to: Material = 1.5 Live load = 1.0 Dead load = 1.0

3) Shallower minimum burial depths may be applicable subject to an assessment of the specific site conditions. For further details please consult our Technical Team on 01509 615100.

Technical Support

Detailed guidance and assistance is available.

For further information, please contact our Technical Team

on **+44 (0) 1509 615100** or email civils@polypipe.com

or visit www.polypipe.com/civils-technical-hub

Polystorm-R Modular Cell can be utilised in these SuDS techniques

TECHNIQUES													
Blue-Green roofs	Podium Decks	Trees	Sports Pitches	Cycle Paths	Permeable Paving (sub base & podium)	Bioretention & Rain Gardens	Attenuation Storage Tanks	Infiltration	Swales	Filter Drains	Detention Basins	Ponds & Wetlands	Filter Strips
			✓			✓	✓	✓	✓	✓	✓	✓	

Visit www.polypipe.com/greeninfrastructure

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