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**LIDL**

**New Hey Road, Huddersfield**

## **SURFACE WATER MAINTENANCE PLAN**

**Final Report**



**January 2025**

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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 (browsers) 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	<p>Use of control systems to allow damping activities to be altered for different applications and weather conditions.</p> <p>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.</p> <p>Use water collected elsewhere on site, such as from Sustainable Drainage Systems (SuDS), for dust suppression activities (may require on-site treatment).</p>
Drilling	<p>Inspect water hose lines for leakage and repair or replace as required.</p> <p>Watertight circulation tanks, rather than pits.</p> <p>Use of meters on supply lines/consumption monitoring for high demand activities.</p>

### 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.

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### **3.0 SURFACE WATER MAINTENANCE PLAN**

#### **3.1 Maintenance Strategy**

3.1.1 All drainage 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 has 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 Manholes / PPICs**

3.2.1 Manholes are typically sized to accommodate for the design flow and developed in accordance with Sewers for Adoption, which relates to the incoming and outgoing pipe diameters. However, as the system is not Adopted, PPICs have been used where manufacturer's limitations permit. Typically, PPICs can be used for depths up to 3m and for pipe diameters up to 225mm.

3.2.2 Personnel access into PPIC chambers is not possible, and therefore rodding/jetting should be carried out from ground level. This is generally accepted as good practice and in accordance with good health and safety procedures. Where larger manholes, which could accommodate man access, have been included maintenance should also take place from ground level. Man, access should be resisted and only used as a last resort.

3.2.3 Manholes have been located outside the building in all cases which will allow much greater freedom with future maintenance access.

Maintenance schedule	Required action	Frequency
Regular maintenance / Monitoring	Covers should be lifted and inspected for litter and debris to ensure that the runs are free-flowing.	Monthly (or as required).
	Remove any debris/litter.	Monthly (at start, then as required).
	Removal of sediment from both manholes and PPIC's.	Six monthly (or following significant rainfall event).
Occasional maintenance	Inspect inlets, outlets and inspection points for blockages, clogging, standing water and structural damage.	Monthly.

### 3.3 Inlets, Outlets, Flow Control Device and Inspection Chambers

- 3.3.1 Inlets and outlets structures may be surface structures or conveyance pipes with guards or headwalls. They must be free from obstruction at all times.
- 3.3.2 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).

### 3.4 **Attenuation Tank**

- 3.4.1 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.
- 3.4.2 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.
- 3.4.3 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.
- 3.4.4 The proposed geocellular units have received an agreement certificate form the BBA included within **Appendix B**

Maintenance Schedule	Required Action	Frequency
Occasional Maintenance and Monitoring	Litter and debris removal from upstream and downstream Manholes/PPICs.	Monthly (or as required).
	Inspect inlets for silt accumulation. Establish appropriate silt removal frequencies. Significant silt build-ups suggest the tanks may be silting up; the tanks should be cleaned with reference to the manufacturers’ literature.	Half yearly as a minimum. Additional checks following significant rainfall events.

### 3.5 **Spillage -Emergency Action**

- 3.5.1 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.
- 3.5.2 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.

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## APPENDICES

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## APPENDIX A – DRAINAGE DRAWINGS



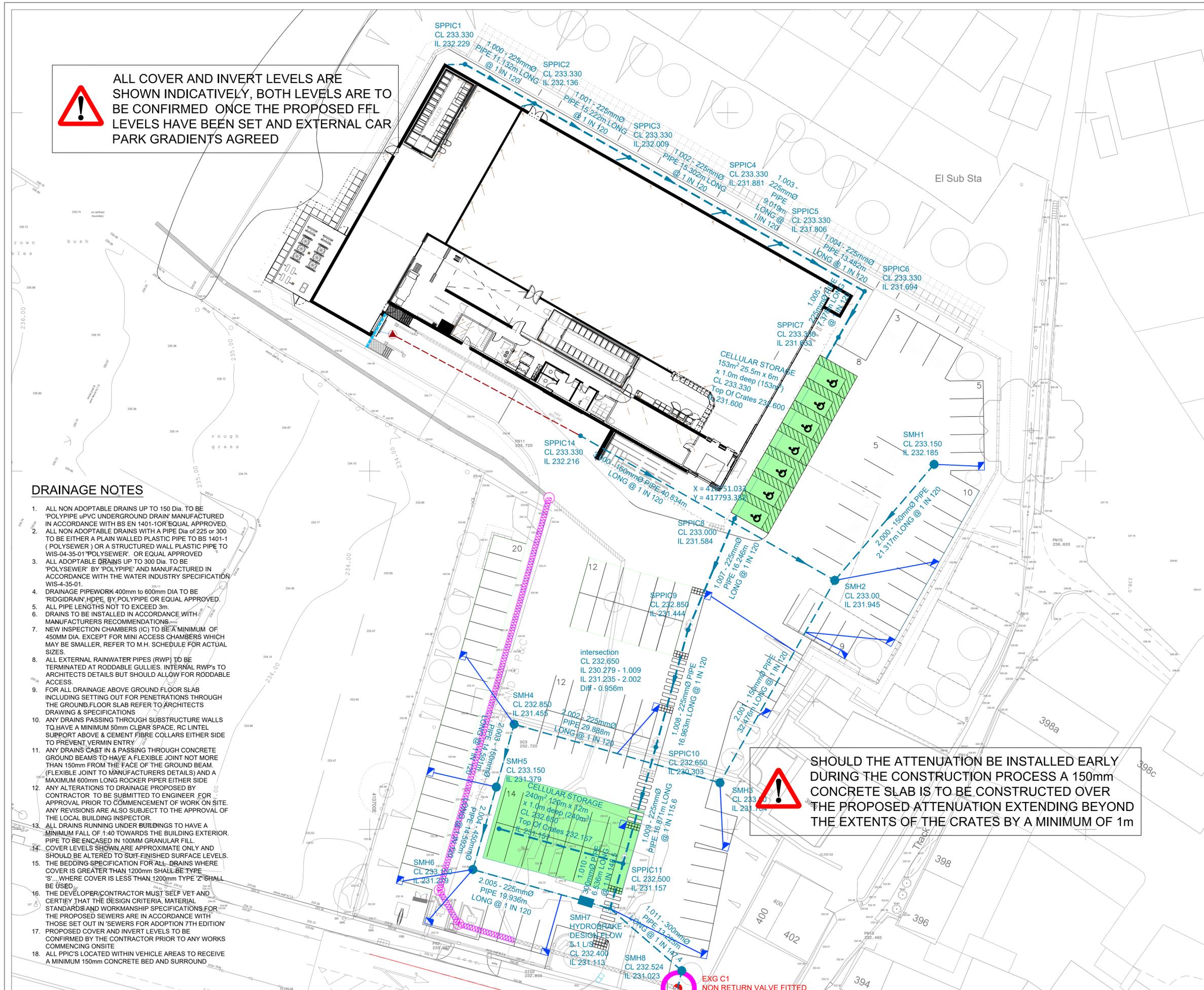
ALL COVER AND INVERT LEVELS ARE SHOWN INDICATIVELY, BOTH LEVELS ARE TO BE CONFIRMED ONCE THE PROPOSED FFL LEVELS HAVE BEEN SET AND EXTERNAL CAR PARK GRADIENTS AGREED

### 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 PIPER 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 1200mm 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
- KLARGESTER BY PASS SEPARATOR REF NSBE10 2072 x 1220mm
- EXISTING FOUL AND SURFACE WATER FEATURES TO BE INVESTIGATED TO IDENTIFY POTENTIAL EXISTING OUTFALLS
- PROPOSED GULLY



SHOULD THE ATTENUATION BE INSTALLED EARLY DURING THE CONSTRUCTION PROCESS A 150mm CONCRETE SLAB IS TO BE CONSTRUCTED OVER THE PROPOSED ATTENUATION EXTENDING BEYOND THE EXTENTS OF THE CRATES BY A MINIMUM OF 1m

Rev	Date	Revision Details	By	Chkd	Appd
P5	JAN 25	ROOF WATER REDIRECTED	GRE		
P4	DEC 24	ILFA COMMENTS ADDED	GRE		
P3	NOV 24	YORKSHIRE WATER COMMENTS ADDED	GRE		
P2	NOV 24	ATTENUATION DETAIL UPDATED	GRE		
P1	AUG 24	FIRST ISSUE	GRE		

# Cora<sup>i</sup>ht

Client	LIDL GREAT BRITAIN Ltd				
Project	NEW HEY ROAD				
Title	DRAINAGE ARRANGEMENT SHEET 1 OF 2				
Drawing No.	16-3046-101	Revision	P5		
Scale	1:250 @ A1	Date	AUGUST 2024		
Drawn	GRE	Chk	App		

EXG C1 NON RETURN VALVE FITTED



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## APPENDIX B – POLYSTORM R INFORMAITON

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.

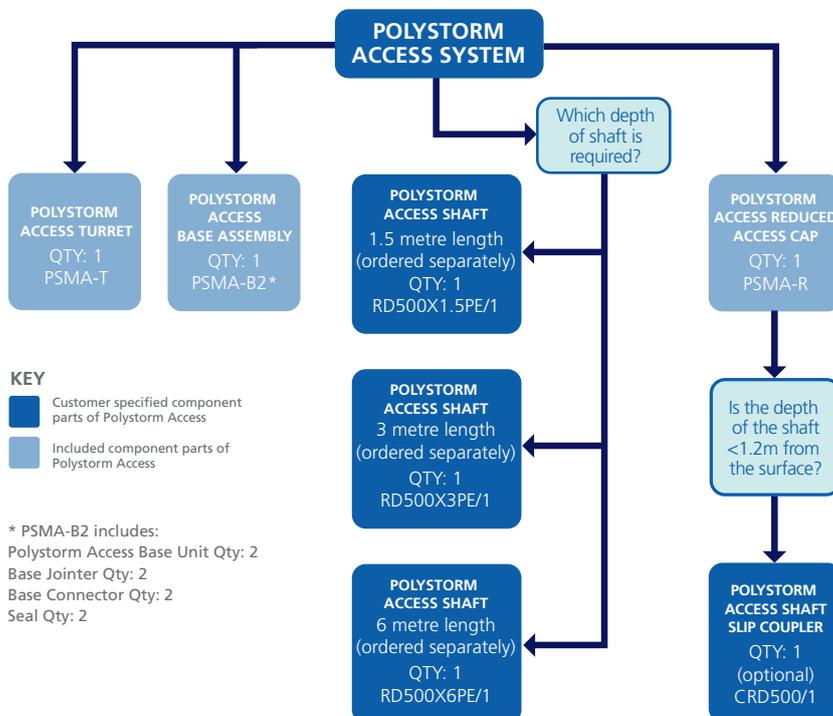
Polystorm Access is suitable for use with Polystorm, Polystorm-R, Polystorm Lite and Polystorm Xtra and may be combined with Polystorm Inspect for full length remote inspection and maintenance.



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

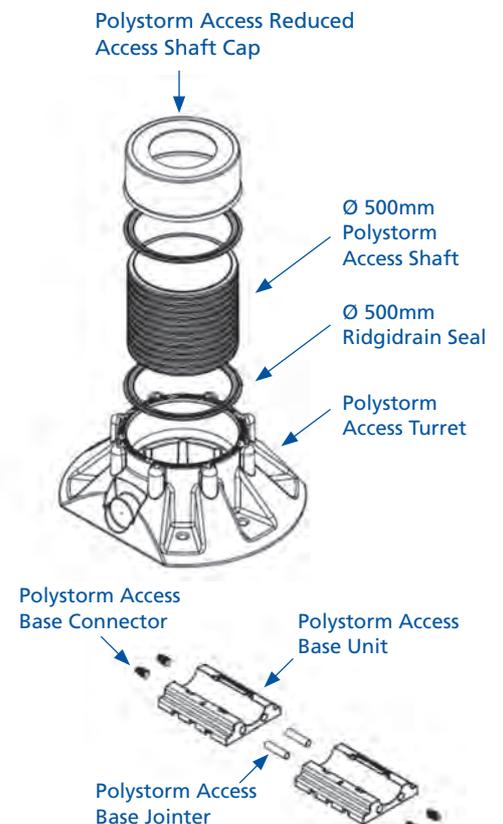
## Key Benefits

- 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

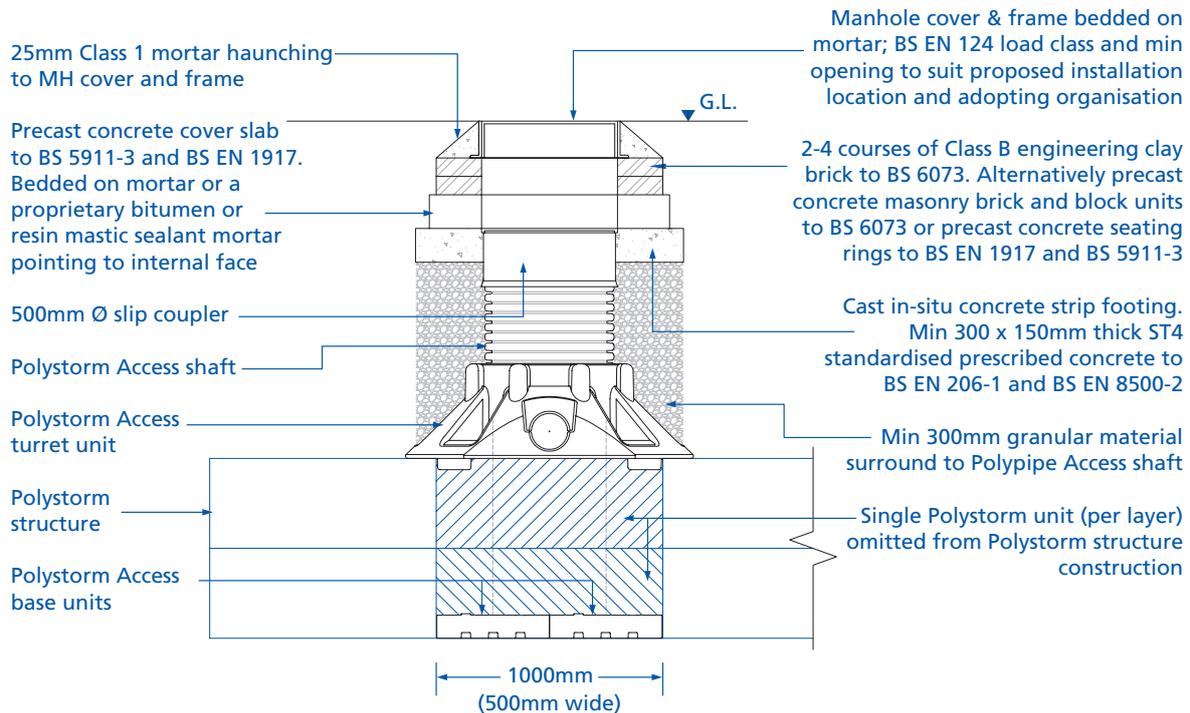


**KEY**  
 Customer specified component parts of Polystorm Access  
 Included component parts of Polystorm Access

\* PSMA-B2 includes:  
 Polystorm Access Base Unit Qty: 2  
 Base Jointer Qty: 2  
 Base Connector Qty: 2  
 Seal Qty: 2



## 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](mailto: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](mailto:civils@polypipe.com) or visit [www.polypipe.com/civils-technical-hub](http://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
			✓			✓	✓	✓	✓	✓	✓	✓	

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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 Ridgidrain 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](http://www.polypipewms.co.uk).

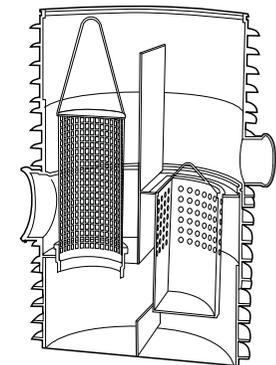
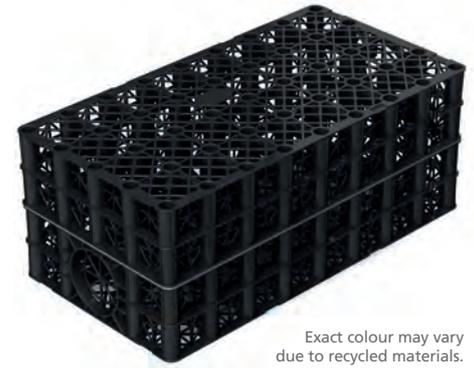


Figure 47

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/m<sup>2</sup>. 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/m<sup>2</sup>
- 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
<b>PHYSICAL PROPERTIES</b>	
Length	1m
Width	0.5m
Depth	0.4m
Total volume	0.2m <sup>3</sup>
Unit weight	9kg
Unit storage volume	0.19m <sup>3</sup> (190 litres)
Void ratio	95%
<b>SHORT TERM COMPRESSIVE STRENGTH</b>	
Vertical	Maximum 610 kN/m <sup>2</sup> *
Lateral	Maximum 63 kN/m <sup>2</sup> *
<b>SHORT TERM DEFLECTION</b>	
Vertical	60 kN/m <sup>2</sup> per mm
Lateral	4.4 kN/m <sup>2</sup> 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 <sup>3</sup>	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/m<sup>3</sup>
- 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	
		<3000kg 0.50	Car park with vehicle mass <GVW <9000kg 0.65
Minimum cover depth required (m)	0.50		

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](mailto:civils@polypipe.com) or visit [www.polypipe.com/civils-technical-hub](http://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](http://www.polypipe.com/greeninfrastructure)

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## APPENDIX C – KLARGESTER TECHNICAL INFORMATION

## Water Management Solutions

# Klargester AquaOil Bypass MDPE and GRP / Full retention MDPE and GRP separator range

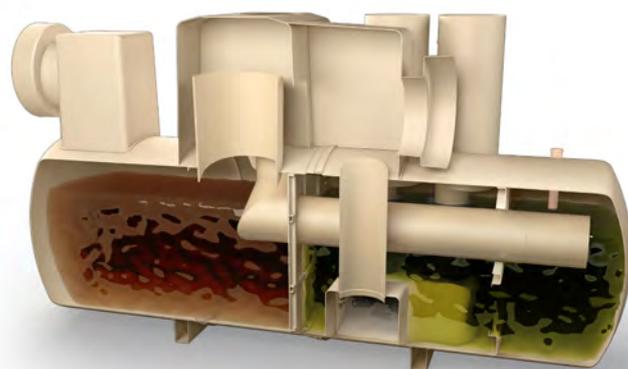
Proactive pollution prevention with SmartServ Pro (available as optional extra). Ask our team for details.



170 – 69,444m<sup>2</sup>  
Available to cover flow rates up to 285 litres per second

### Why choose an AquaOil fuel and oil separator?

- Total peace of mind offered through SmartServ Pro remote monitoring system, for early fault detection and in line with Kingspan's Planet Passionate programme
- EN 858-1 approved
- Total flexibility, with deep invert options available
- Range tested against full flow
- Easily utilised as part of SuDS Management Train
- Full range of bypass and full retention separators available



### Our range has been tested against full flow - why is this important?

Our units have been tested at their maximum flow rate (10l/s), unlike some products which have been tested based on bypass and therefore only 10% of the flow. This ensures total accuracy of our silt retention results, by replicating the full effect of the silt wash through.

As part of our Planet Passionate programme, Kingspan are dedicated to delivering innovative surface water management technologies, developed on the back of 65 years' experience.

\*Terms and conditions apply. View online at <https://www.kingspan.com/gb/en-gb/products/wastewater-management/warranty-terms>



Product Code	Flow (l/s)	Drainage Area (m <sup>2</sup> )	Silt Capacity (ltrs)	Oil Capacity (ltrs)	Length (mm)	Diameter (mm)	Manhole Cover Dimensions (mm)	Base to Inlet Invert (mm)	Base to Inlet Invert (mm)	Min. Inlet Invert (mm)	Std Pipework Diameter (mm)
<b>Polyethylene Chamber Construction</b>											
NSFP003	3	170	300	30	1700	1350	600	1410	1335	550	160
NSFP006	6	335	600	60	1700	1350	600	1410	1335	550	160
<b>GRP Chamber Construction</b>											
NSFA010	10	555	1000	100	2610	1225	600	1050	1000	500	200
NSFA015	15	835	1500	150	3910	1225	600	1050	1000	500	200
NSFA020	20	1115	2000	200	3230	2010	600	1810	1760	1000	315
NSFA030	30	1670	3000	300	3960	2010	600	1810	1760	1000	315
NSFA040	40	2225	4000	400	4750	2010	600	1810	1760	1000	315
NSFA050	50	2780	5000	500	5790	2010	600	1810	1760	1000	315
NSFA065	65	3160	6500	650	7360	2010	600	1810	1760	1000	315
NSFA080	80	4445	8000	800	5744	2820	600	2500	2450	1000	315
NSFA100	100	5560	10000	1000	6200	2820	600	2500	2450	1000	400
NSFA125	125	6945	12500	1250	7365	2820	600	2500	2450	1000	450
NSFA150	150	8335	15000	1500	8675	2820	600	2550	2450	1000	525
NSFA175	175	9725	17500	1750	9975	2820	600	2550	2450	1000	525
NSFA200	200	11110	20000	2000	11280	2820	600	2550	2450	1000	600
NSFA210	210	11667	21000	2100	11994	2820	600	2550	2450	1000	600
NSFA225	225	12500	22500	2250	12766	2820	600	2550	2450	1000	600
NSFA240	240	13333	24000	2400	13528	2820	600	2550	2450	1000	600
NSFA255	255	14167	25500	2550	14300	2820	600	2550	2450	1000	600
NSFA270	270	15000	27000	2700	15071	2820	600	2550	2450	1000	600
NSFA285	285	15833	28500	2850	15833	2820	600	2550	2450	1000	600

#### Forecourt Separator Range Technical Specifications

Sepaator Class	Backfill Type	Total Capacity (Ltrs)	Darinage Area (m <sup>2</sup> )	Peak Flow Rate (l/s)	Length (mm)	Diameter (mm)	Access Shaft Diameter (mm)	Base Inlet Invert (mm)	Base to Outlet Invert (mm)	Standard Fall Across (mm)
1	Concrete	10000	720	15	3915	2020	600	2180	2130	50
1	Concrete	10000	115	20	3915	2020	600	2180	2130	50

#### Bypass Separator Range Technical Specifications

Model Reference	Flow (l/s)	Peak Flow Rate (l/s)	Drainage Area (m <sup>2</sup> ) Based on UK rainwater flow	Storage Capacity (Ltrs)		Length (mm)	Diameter (mm)	Access Shaft Diameter* (mm)	Base Inlet Invert (mm)	Base to Outlet Invert (mm)	Standard Fall Across (mm)	Min Inlet Invert (mm)	Standard Pipework Diameter (mm)**
				Silt	Oil								
<b>Polyethylene Chamber Construction</b>													
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
<b>GRP Chamber Construction</b>													
<b>NSBE010</b>	<b>10</b>	<b>100</b>	<b>5560</b>	<b>1000</b>	<b>150</b>	<b>2069</b>	<b>1220</b>	<b>750</b>	<b>1450</b>	<b>1350</b>	<b>100</b>	<b>700</b>	<b>315</b>
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5941	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

\*Some units have more than one access shaft - diameter of largest shown | \*\*Large pipework available on request.

For more information on any of our products | T: +44 (0)1296 633 209

E: [elliott.evans@kingspan.co.uk](mailto:elliott.evans@kingspan.co.uk) or visit [kingspan.co.uk/klargester](http://kingspan.co.uk/klargester)

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