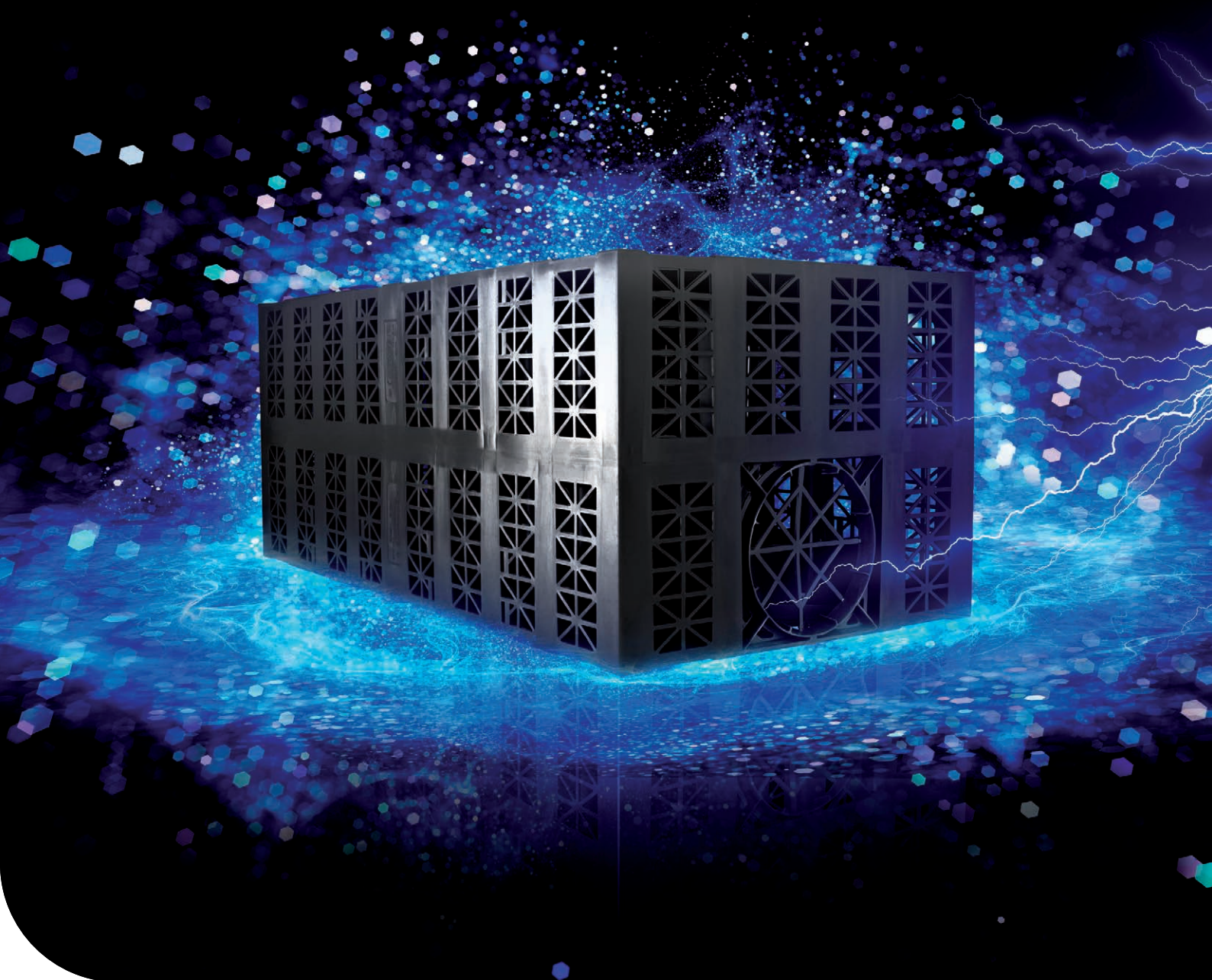


STORMWATER MANAGEMENT

AquaCell systems

Operation and maintenance guide



Storming performance

Thank you for choosing the AquaCell range of geocellular systems – the tried and tested solution to the effective management of excessive rainfall, whether through attenuation or infiltration.

All AquaCell units are engineered from reformulated, recycled material, so as concern grows over the effects of climate change and the challenges of increasing urbanisation, AquaCell continues to rain supreme as the cost-effective, proven and versatile stormwater solution.

The AquaCell range can be used as either a temporary storage tank or soakaway, and is suitable for applications including:

- ④ Landscaped areas
- ④ Parks
- ④ Domestic gardens
- ④ Residential developments
- ④ Car parks and roads
- ④ Industrial/Commercial areas

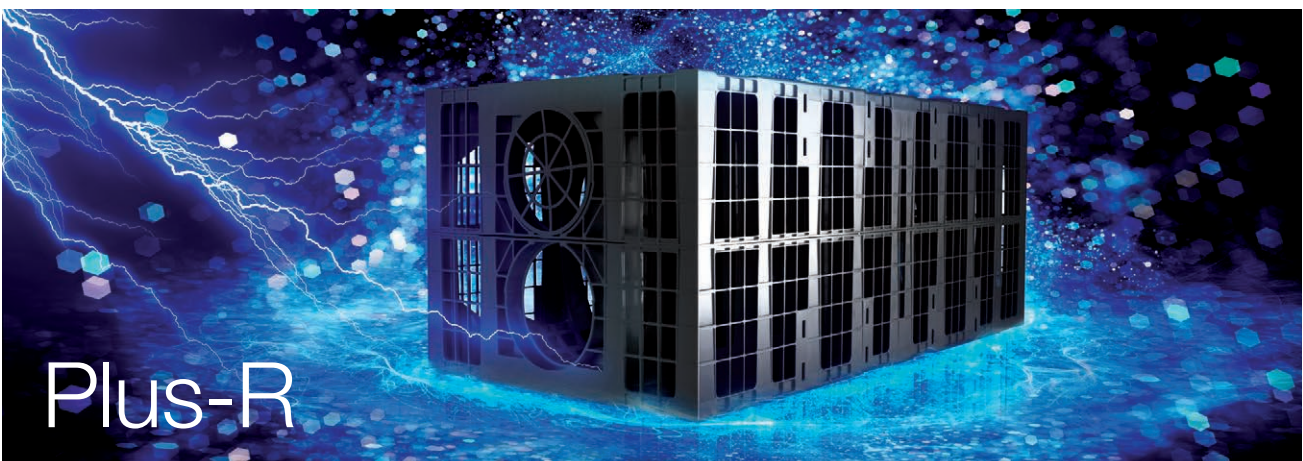
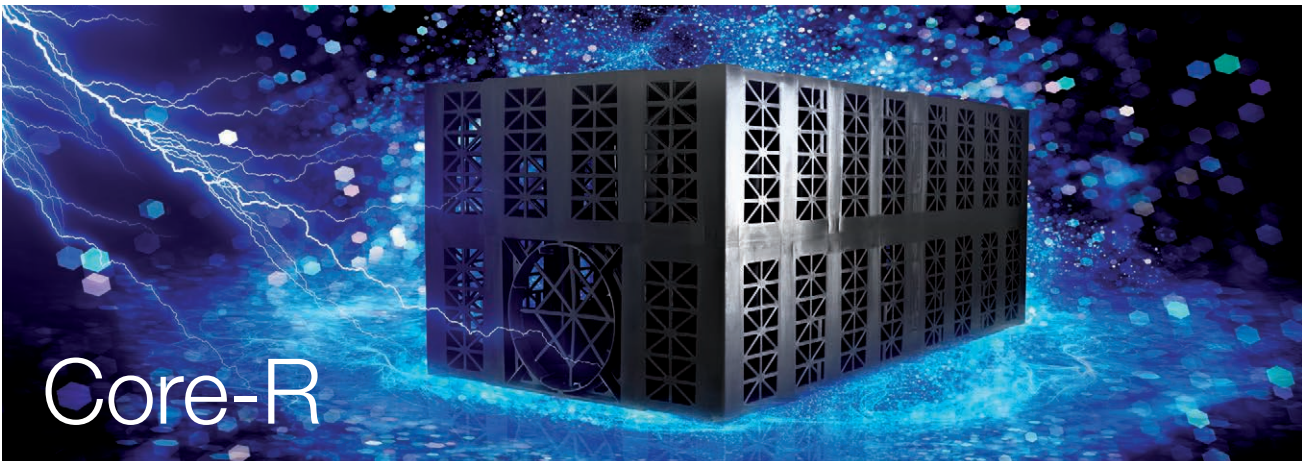
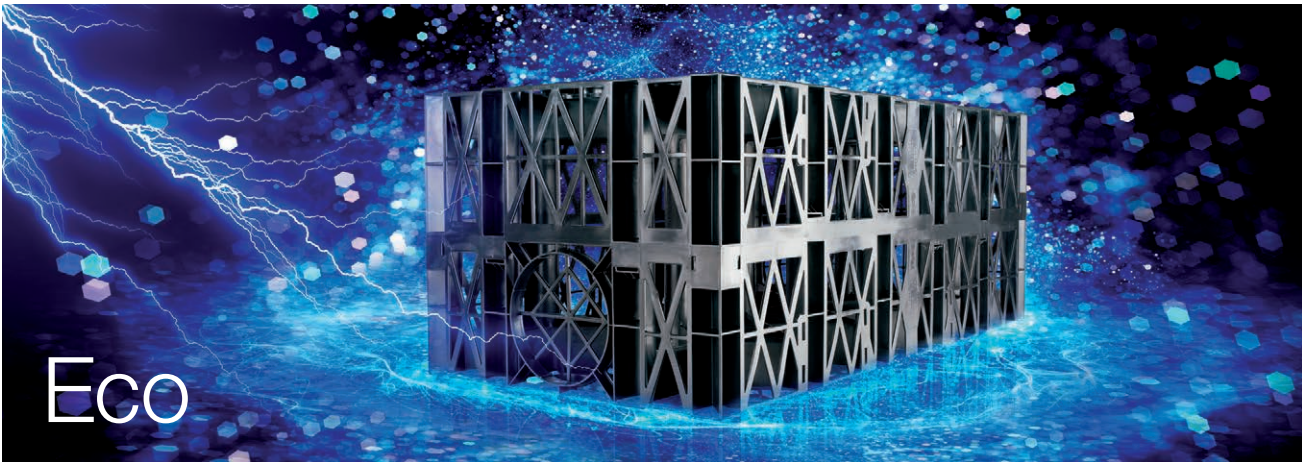
Each of the three AquaCell units can be used as a standalone system, or different unit types can be mixed and matched together in layers to value engineer the most cost effective solution.

All AquaCell units have identical dimensions (1m x 0.5m x 0.4m), but they are manufactured to perform differently. The type of unit, or combination of units required depends on factors such as the load application, overall installation depth and site conditions.

This guide provides information on typical installation methods and construction loads, as well as guidance on how to inspect and maintain your AquaCell tank to ensure its ongoing optimum performance.

Discover more online at: **wavin.co.uk/aquacell**

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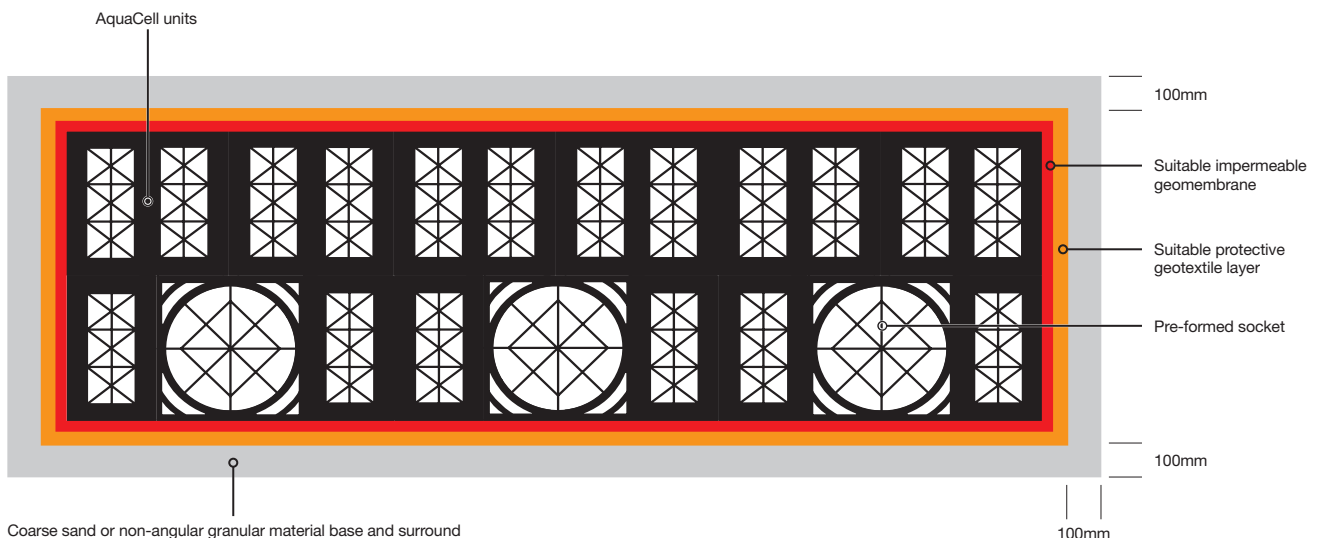
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Installation

Typical storage tank installation method

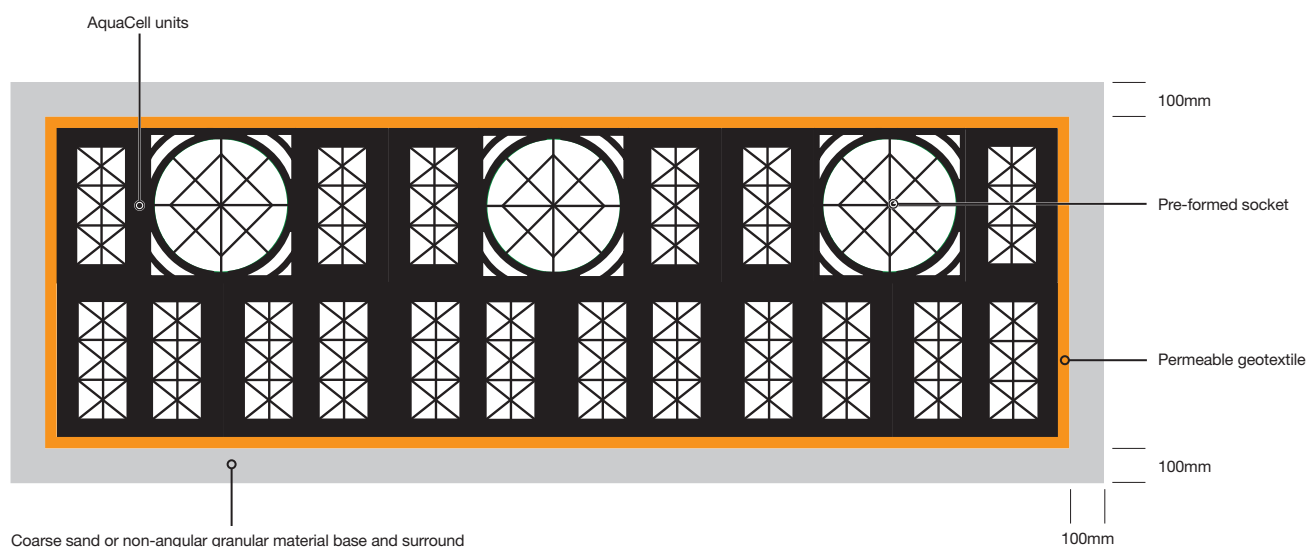
1. Excavate the trench to the required depth ensuring that the plan area is slightly greater than that of the AquaCell units.
2. Lay 100mm bed of coarse sand or non-angular granular material, then level and compact.
3. Lay the geotextile over the base and up the sides of the trench.
4. Lay the geomembrane on top of the geotextile over the base and up the sides of the trench.
5. Lay the AquaCell units parallel with each other. In multiple layer applications, wherever possible, continuous vertical joints should be avoided. AquaCell units can be laid in a 'brick bonded' formation (i.e. to overlap the joints below). For single layer applications use the AquaCell Clips, and for multiple layers use the AquaCell Clips and the AquaCell Shear Connectors (vertical rods).
6. Wrap the geomembrane around the AquaCell structure and seal to manufacturer's recommendations.
7. If side connections into the AquaCell units are required, (other than the preformed socket), use the appropriate Flange Adaptor (6LB104 or 6LB106). Fix the flange adaptor to the unit using self-tapping screws. Drill a hole through the flange adaptor and connect the pipework. (6LB106 should not be used with AquaCell Eco).
8. In order to prevent silt from entering the tank, clogging inlet pipework and reducing storage capacity, it is recommended that a silt trap is installed prior to the inlet pipework.
9. Wrap and overlap the geotextile, covering the entire AquaCell structure to protect the geomembrane.
10. Lay 100mm of coarse sand or non-angular granular material between the trench walls and the AquaCell structure and compact.
11. Lay 100mm of coarse sand or non-angular granular material over the geotextile/geomembrane and compact.
12. Backfill with suitable material.

NB: A storage tank must be vented, and it is recommended that one 110mm diameter vent pipe is provided per 7,500m² of impermeable catchment area on site.



Typical soakaway installation method

1. Excavate the trench to the required depth ensuring that the plan area is slightly greater than that of the AquaCell units.
2. Lay 100mm bed of coarse sand or non-angular granular material, then level and compact.
3. Lay the geotextile over the base and up the sides of the trench.
4. Lay the AquaCell units parallel with each other. In multiple layer applications, wherever possible, continuous vertical joints should be avoided. AquaCell units can be laid in a 'brick bonded' formation (i.e. to overlap the joints below). For single layer applications use the AquaCell Clips, and for multiple layers use the AquaCell Clips and the AquaCell Shear Connectors (vertical rods).
5. Fix the Adaptors to the AquaCell units as required and connect pipework.
6. In order to prevent silt from entering the tank, clogging inlet pipework and reducing storage capacity, it is recommended that a silt trap is installed prior to the inlet pipework.
7. Wrap and overlap the geotextile, covering the entire AquaCell structure.
8. Lay 100mm of coarse sand or non-angular granular material between the trench walls and the AquaCell structure and compact.
9. Lay 100mm of coarse sand or non-angular granular material over the geotextile and compact.
10. Backfill with suitable material.
11. Rainwater from roof areas may discharge directly into the soakaway, but rainwater from car parks must discharge through a catchpit manhole and/or a petrol interceptor.



Construction loads

AquaCell Core-R and Plus-R: Construction loads

Construction plant such as excavators can impose significant loads on any AquaCell unit. The following guidelines should be observed:

- ⦿ Tracked excavators (not exceeding 21 tonnes in weight) should be used to place fill over the AquaCell units when the geotextile or geomembrane wrapping has been completed.
- ⦿ At least 300mm of fill should be placed before the excavators or trucks delivering the backfill are allowed to traffic over the installed units.
- ⦿ Compaction plant used over the AquaCell units should not exceed 2,300kg/m width. This will allow the compaction of Type 1 sub-base in 150mm layers over the units in accordance with the Specification for Highways Works.
- ⦿ All other construction plant should be prevented from trafficking over the system once it is installed and surfacing completed, unless a site-specific assessment demonstrates that it is acceptable.
- ⦿ In particular, cranes should not be used, or place their outriggers, over the system.

AquaCell Eco: Construction loads

As AquaCell Eco is designed for landscaped and non-loaded applications, certain precautions are recommended on site to prevent damage to the units through excess loading.

Manual assembly

Whilst assembling the tank, it may be necessary to walk on top of previously laid AquaCell units. Therefore, care should be taken not to damage the edges of the units.

Backfilling

When backfilling AquaCell Eco installations:

- ⦿ Machines placing the material must be located OFF the units.
- ⦿ Only light compaction should be applied to the material.
- ⦿ Backfill with suitable, stone-free, as-dug material.
- ⦿ First layer should be 300mm thick before using any compaction plant.
- ⦿ NO vibratory mechanism should be used for compacting this first layer.
- ⦿ Compaction plant must not exceed 2,300kg/m width.

Construction traffic on site

Once backfilled, if construction plant (e.g. excavators or loaders) are likely to run over the installation, ensure that:

- ⦿ MINIMUM protective cover should be 500mm well-compacted granular material.
- ⦿ Only tracked excavators can be used and MUST NOT weigh more than 14 tonnes.
- ⦿ HGVs MUST NOT run over installed AquaCell Eco units.

Inspection and maintenance

AquaCell Plus-R: for inspectability

By aligning AquaCell Plus-R units end-to-end, full length viewing channels can be created – allowing for CCTV inspection, if required. These are created in the bottom layer of an AquaCell tank installation.

The units can be used in combination with AquaCell Core-R (and with Eco if there is at least one layer of AquaCell Core-R in between the Plus-R and Eco layer).

NOTE: For any AquaCell Plus-R units on the perimeter of a structure that are NOT required for inspection access, the open ends of the integral inspection tunnels should be fitted with the end caps provided.

Inspection chambers

An inspection chamber should precede the inlet pipework for the AquaCell structure.

A silt trap or hydro-dynamic separator prior to the inspection chamber is also recommended.

For on-line installations the following Chambers are recommended:

- ⦿ Down to 3m: Wavin Non-Entry Inspection Chambers
- ⦿ Down to 5m: Wavin Range 600 Inspection Chambers, or a traditional manhole*

**Where inlet pipework is replaced by AquaCell units acting as flow conduit.*

For off-line installations:

- ⦿ Manhole with in-built flow control

Recommendation: If installing any Wavin Non-Entry Inspection Chamber, deeper than 1.2m, ensure that the cover and frame includes a 350mm restrictor to prevent man entry.

Inspection and maintenance

CCTV inspection at every inspection point is recommended:

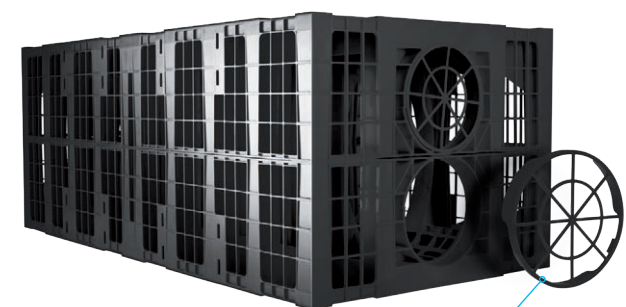
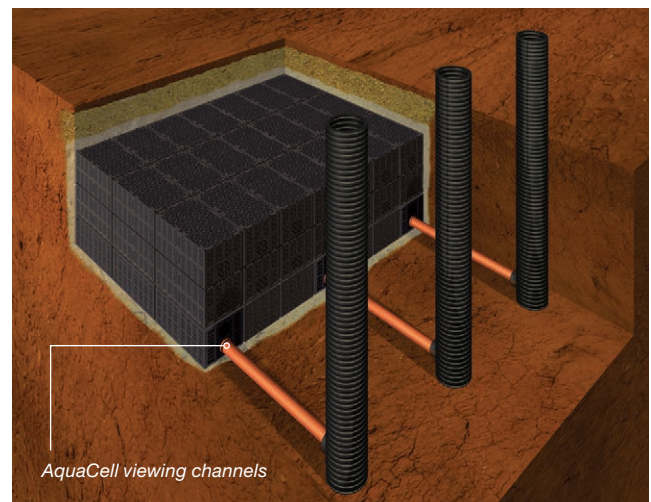
- ⦿ after every major storm
- ⦿ at regular intervals according to the specific maintenance plan for the site

Silt traps prior to inlet pipework should be routinely inspected and cleaned out to minimise debris reaching the tank. It is important to prevent construction silt from entering the AquaCell structure.

AquaCell Plus-R viewing channel



Tank installation with inspection chambers



End cap for when an inspection channel is not required

Maintenance schedule

The below guidance is taken from CIRIA C753: The SuDS Manual.

Regular inspection and maintenance is required to ensure the effective long-term operation of below ground storage systems and soakaways. Maintenance responsibility for systems should be placed with a responsible organisation. The below tables provide guidance on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive, and some actions may not always be required.

Maintenance plans and schedules should be developed during the design phase, and will be specific to the type of tank or soakaway that is adopted. Specific maintenance needs of the system should be monitored and maintenance schedules adjusted to suit requirements.

Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risk to performance).	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually, or as required
Remedial actions	Repair/Rehabilitate inlets, outlets, overflows and vents.	As required
Monitoring	Inspect/Check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years, or as required

Operation and maintenance requirements for soakaways

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber.	Annually
	Cleaning of any gutters and filters on downpipes.	Annually, or as required
	Trimming any roots that may be causing blockages.	Annually, or as required
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber.	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void if performance deteriorates or failure occurs.	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway).	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation.	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring.	Annually

Maintenance will usually be carried out manually, although a suction tanker can be used for sediment/debris removal for large systems. If maintenance is not undertaken for long periods, deposits can become hard-packed and require considerable effort to remove.

References: Woods Ballard, B., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R., Kellagher, R., CIRIA C753 (2015) The SuDs Manual, CIRIA, London, UK (ISBN: 978-0-86017-760-9)

Always on hand to help

If you have any questions about the inspection, maintenance or overall performance of your AquaCell tank during its lifetime, the Wavin Technical Team are always on hand during office hours to offer advice and guidance:

Technical Centre

T 0844 856 5165

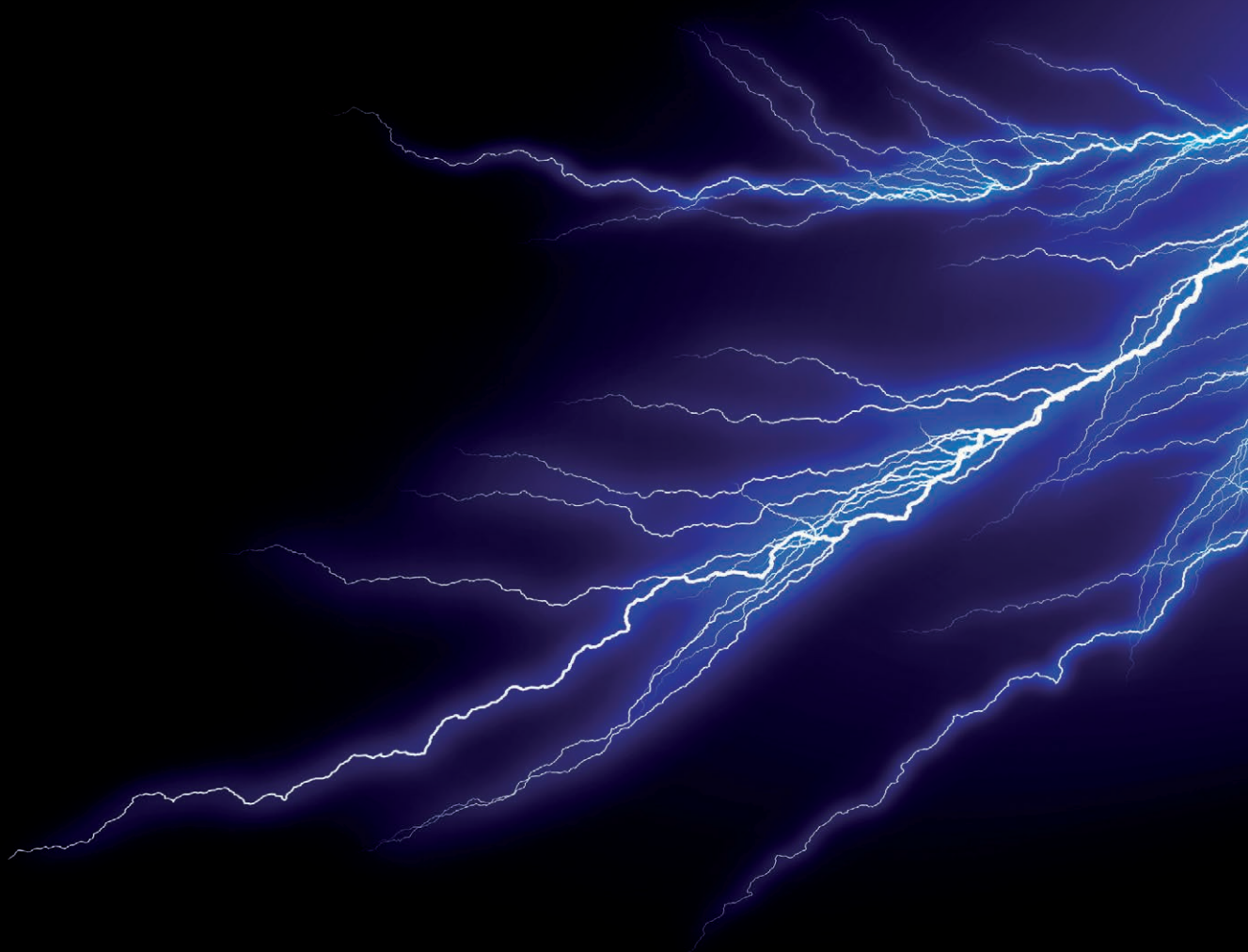
E technical.design@wavin.co.uk

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