

Project Handover Pack

Stormwater Attenuation Tank

Carlton Avenue, Blyth

June 2021

Graf UK Limited

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Registered in England No: 8473746



WARRANTY OF GEOMEMBRANE INSTALLATION WORKS


This document records that all the installation procedures have been checked by a qualified welding engineer of Graf UK Ltd and that the welds conform to CSWIP Standards.

Should the liner or welded seams be found to be of sub-standard quality within a period of 30 years they will be repaired/replaced free of charge, subject to the correct backfilling having been undertaken and all the manufacturer's installation instructions and maintenance and servicing procedures being adhered to.

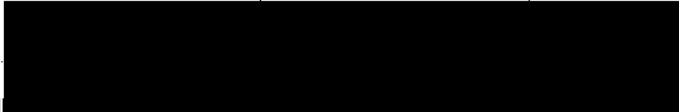
PROJECT: CARLTON AVENUE BLYTH
SITE ADDRESS: BLYTH NE24 4AP
CONTRACTOR: G2B CIVIL ENGINEERING LTD

I have inspected the geomembrane installation works and as far as can be seen they are complete and satisfactory and comply with CSWIP standards:

Signed on behalf of GRAF UK Ltd

Signature: 
Print: Richard Sutton
Date: 28/6/21

Signed by Customer on site at completion

Signature: 
Print: Derek Roberts
Date: 29/6/21



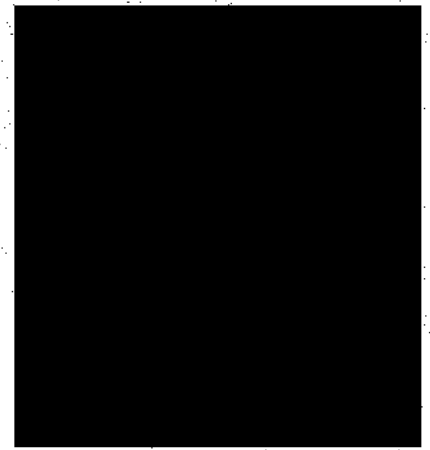
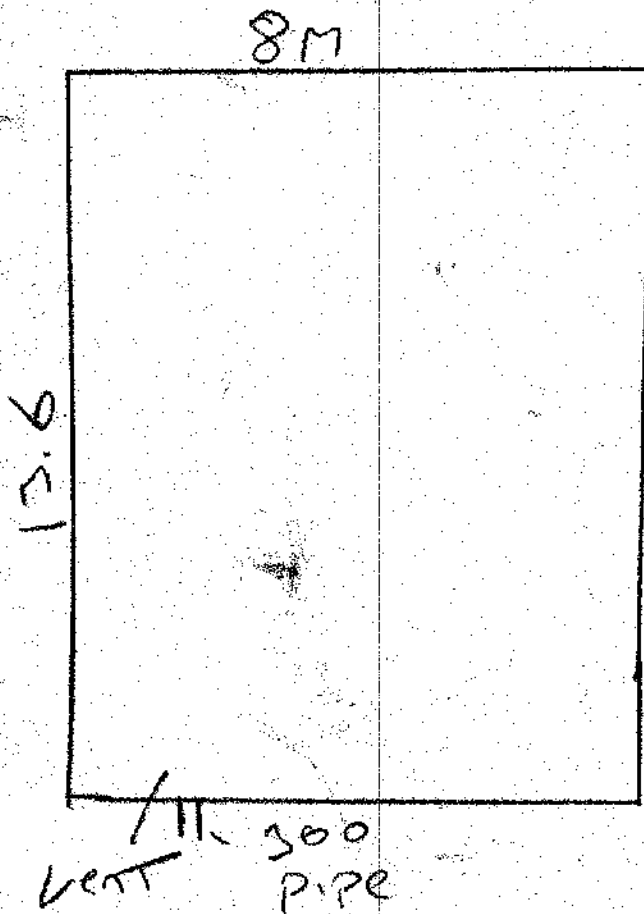
END OF CONTRACT/MOBILISATION SIGN OFF SHEET

These records show that all the installation procedures have been fulfilled and passed by the Quality Engineer and the site has been left tidy at the end of each mobilisation or end of contract.

PROJECT: CARLTON AVENUE BLYTH

CONTRACTOR: G2B CIVIL ENGINEERING

TANK LAYOUT: 13.6 x 8 x 0.74



I have inspected the geomembrane and geotextile surround and as far as can be seen, this tank is complete and satisfactory.

On behalf of Graf UK Ltd

Print Richard Sutton Date 28/6/21

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- NOTES:
1. Proposed Graf UK Ltd Layout.
 2. All dimensions in mm unless otherwise stated.
 3. All temporary and enabling works by others.
 4. Membrane specification - 1.6mm LLDFE, density 0.99g/cm³.
 5. Backfill specification - S1000, density 2.0 g/cm³.
 6. This stage assumes there is no ground water present.
 7. The tank must be installed in a suitable location. The ground must be level and there are 400mm vent pipes for every 7.200m² of impermeable containment area.

Tank Size =
 13.6m x 8m x 0.74m = 80.51m³ (Gross)
 @ 95% Void Ratio = 77.29m³ (Net)

Based on the levels provided on this drawing the proposed tank will be suitable up to 30,000kg vehicle loading in accordance with CIRIA C680 guidelines.

MAXI CRATES(402200) = 340cr
 MAXI BASE PLATES(402200) = 170cr
 MAXI END PLATES(402200) = 64cr (SETS OF 2)
 ECOBLOC CONNECTIONS (402025) = 628cr
 ADAPTOR PLATE (AP-110) Ø100mm PIPE = 1cr
 ADAPTOR PLATE (APTW-300MM)Ø300mm PIPE = 1cr

City cut is returned up to the next 5th


Membrane
 GULLPIPE-1MM 319m² = 6.8m x 65m
 Gabletile - SNW40 360m² = 4m x 90m
 TERREX-SNW40

C. FRAMES REQUIRED

This drawing has been produced from MDesign
 Dwg No: ND1378050 Rev: 0 Site Drainage

REV	DESCRIPTION	BY	DATE
C1	ISSUED FOR CONSTRUCTION	AP	08.06.21
P1	REVISED TO SEALED 675 LEM & PVC TANK	AP	07.06.21
P2	PERMISSIBLE PARKING LACTAR ADDED	AP	07.06.21
P3	PRELIMINARY FOR APPROVAL	AP	26.04.21

FOR CONSTRUCTION

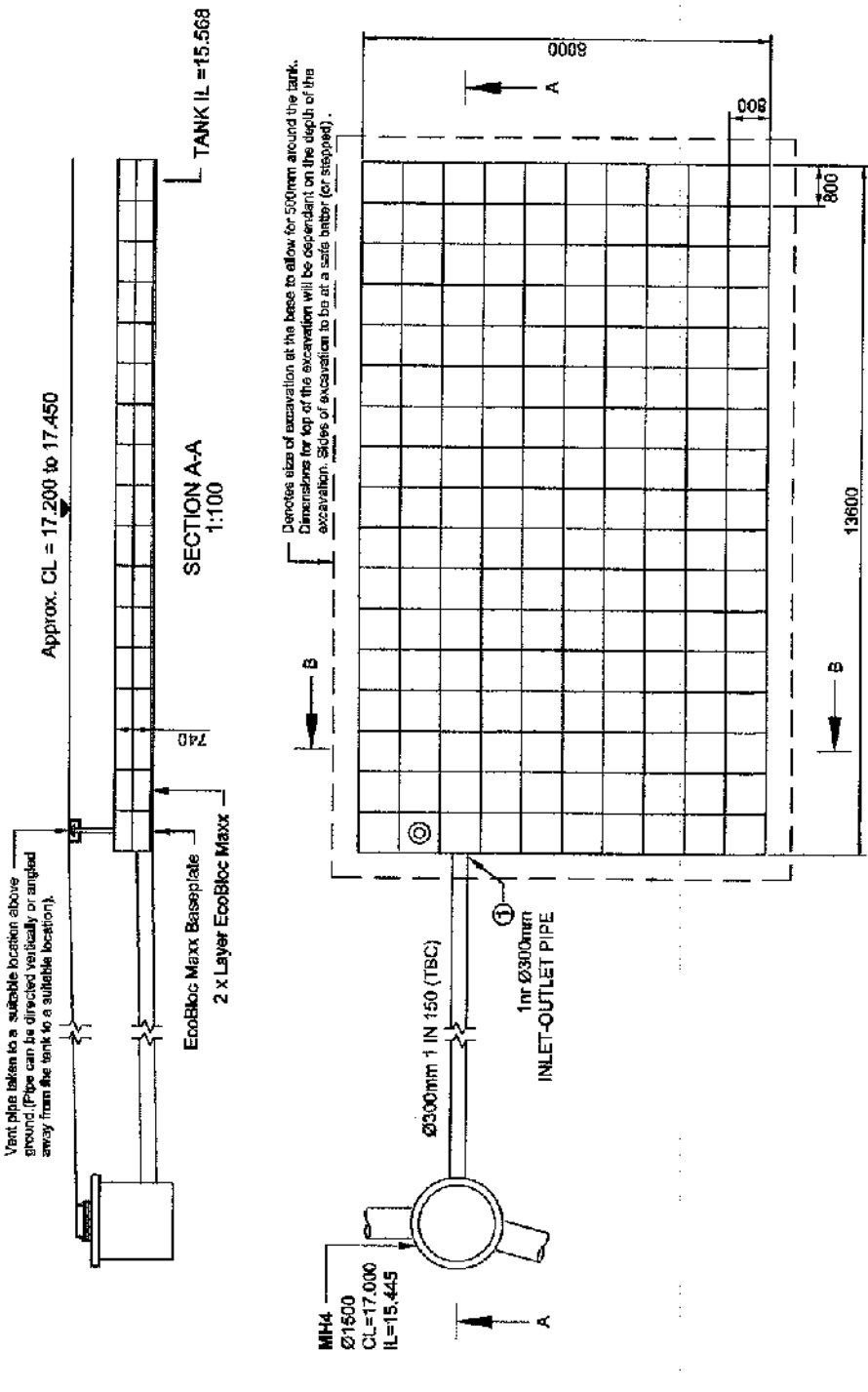


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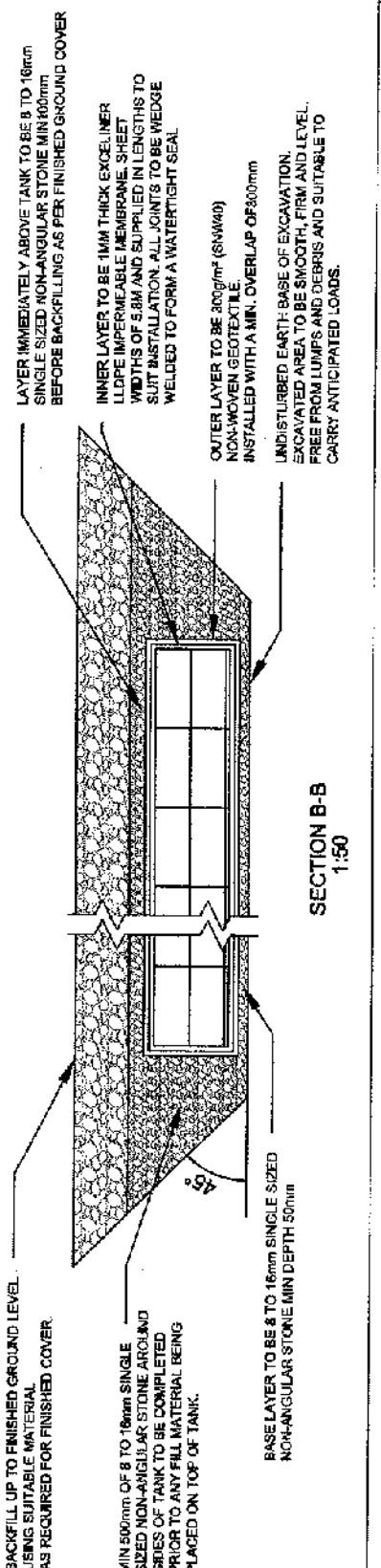
DRAWN: AP DATE: 28/04/2021
 CHECKED: MC SCALE: VARIOUS/AS
 PROJECT: CARLTON AVENUE, BLYTH

DESCRIPTION: ATTENUATION TANK 1
 using GRAF ECOBLOC MAXX

DRAWING NO: Carlton Av. Blyth_001 REV: C1



NOTE: EXCAVATION TO EXCEED TANK SIZE BY 500MM ON ALL SIDES TO ALLOW FOR ACCESS



BACKFILL UP TO FINISHED GROUND LEVEL USING SUITABLE MATERIAL AS REQUIRED FOR FINISHED COVER.

MIN 500mm OF 8 TO 16mm SINGLE SIZED NON-ANGULAR STONE AROUND SIDES OF TANK TO BE COMPLETED PRIOR TO ANY FILL MATERIAL BEING PLACED ON TOP OF TANK.

BASE LAYER TO BE 8 TO 16mm SINGLE SIZED NON-ANGULAR STONE MIN DEPTH 50mm

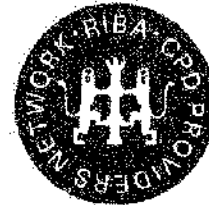
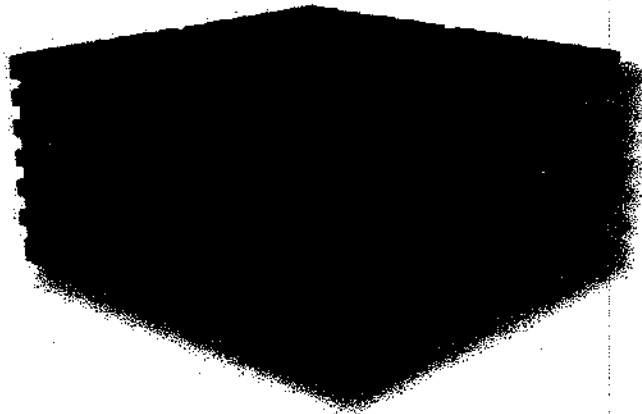
INNER LAYER TO BE 1MM THICK EXCELSEOR LLDFE IMPERMEABLE MEMBRANE SHEET WIDTHS OF 5.8M AND SUPPLIED IN LENGTHS TO SUIT INSTALLATION. ALL JOINTS TO BE WEDGE WELDED TO FORM A WATERTIGHT SEAL.

OUTER LAYER TO BE 300g/m² (SNW40) NON-WOVEN GEOTEXTILE INSTALLED WITH A MIN. OVERLAP OF 800mm

UNDISTURBED EARTH BASE OF EXCAVATION. EXCAVATED AREA TO BE SMOOTH, FIRM AND LEVEL, FREE FROM LUMPS AND DEBRIS AND SUITABLE TO CARRY ANTICIPATED LOADS.

EcoBloc Maxx

Stormwater Management Systems



	Grate	Baseplate
Dimensions (mm)	800 x 800 x 350	800 x 800 x 40
Gross Volume (m ³)	0.225m ³	0.025m ³
Net Volume (m ³)	0.217m ³	0.020m ³
Material	Polypropylene	Polypropylene
Weight	9kg	4kg
Void Ratio	96% depending on number of layers	
Inspectable	Yes, when combined with EcoBloc Flex	
*UCS Vertical	340 kN/m ²	
*UCS Lateral	110 kN/m ²	

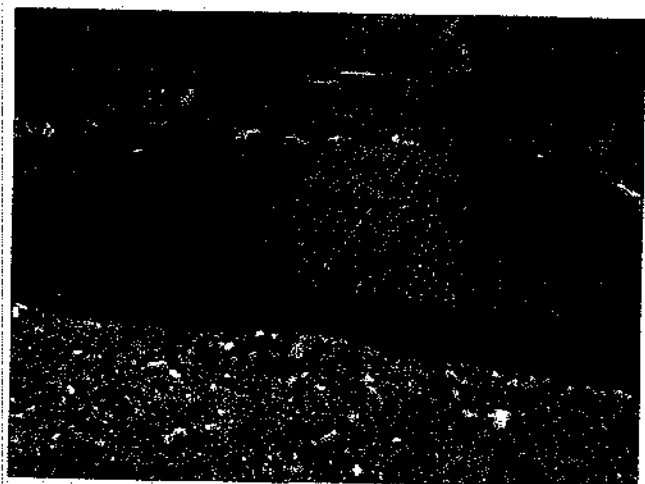
**Ultimate Compressive Strength*

	Load			
	13T	12T	30T	40T
<i>Based on backfill @ 30° density 20kN/m² and tank of 0.70m (2 crates deep)</i>				
<i>Cover in m *</i>				
Min. Cover	0.26	0.62	0.68	0.82
Max. Cover	3.65	3.40	3.40	3.40
<i>Max. Installation Depth in m *</i>				
With Backfill @ 26°	3.93	3.67	3.67	3.67
With Backfill @ 30°	4.86	4.58	4.58	4.58
With Backfill @ 34°	5.10	4.82	4.82	4.82
With Backfill @ 38°	4.88	4.61	4.61	4.61

**It is advised that structural design calculations are carried out prior to work commencing.
 **Installation depths and loadings outside of the information in this table may be permissible depending on site conditions. Contact Graf UK for more information.*



Endeavour Drive, Basildon (UK)



Housing Estate, Aberdeenshire (UK)

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- NOTES:**
- All dimensions in mm, unless otherwise stated.
 - All dimensions are to nominal and may vary within manufacturing tolerances.
 - All dimensions are to be taken to the outside of the structure.
 - Concrete is to be finished to a smooth finish with a GEF finish.
 - This drawing is intended for guidance only. Confirmation of the suitability for a particular project should be sought from the issuing authority prior to final design or commencement of any construction work.

ECOBLOC MAXX



Property	Value
Dimensions (mm)	800 x 800 x 230, 500 x 800 x 40
Gross Volume (m³)	0.528m³
Net Volume (m³)	0.217m³
Material	Polypropylene
Weight	4kg
Void Ratio	56%, depending on number of layers
Impermeable	Yes, when combined with Ecobloc Plus
UCS Vertical	340 kN/m²
UCS Lateral	110 kN/m²
Ultimate Compressive Strength	



REV	DESCRIPTION	DATE
1	LATEST REVISION	10/01/19

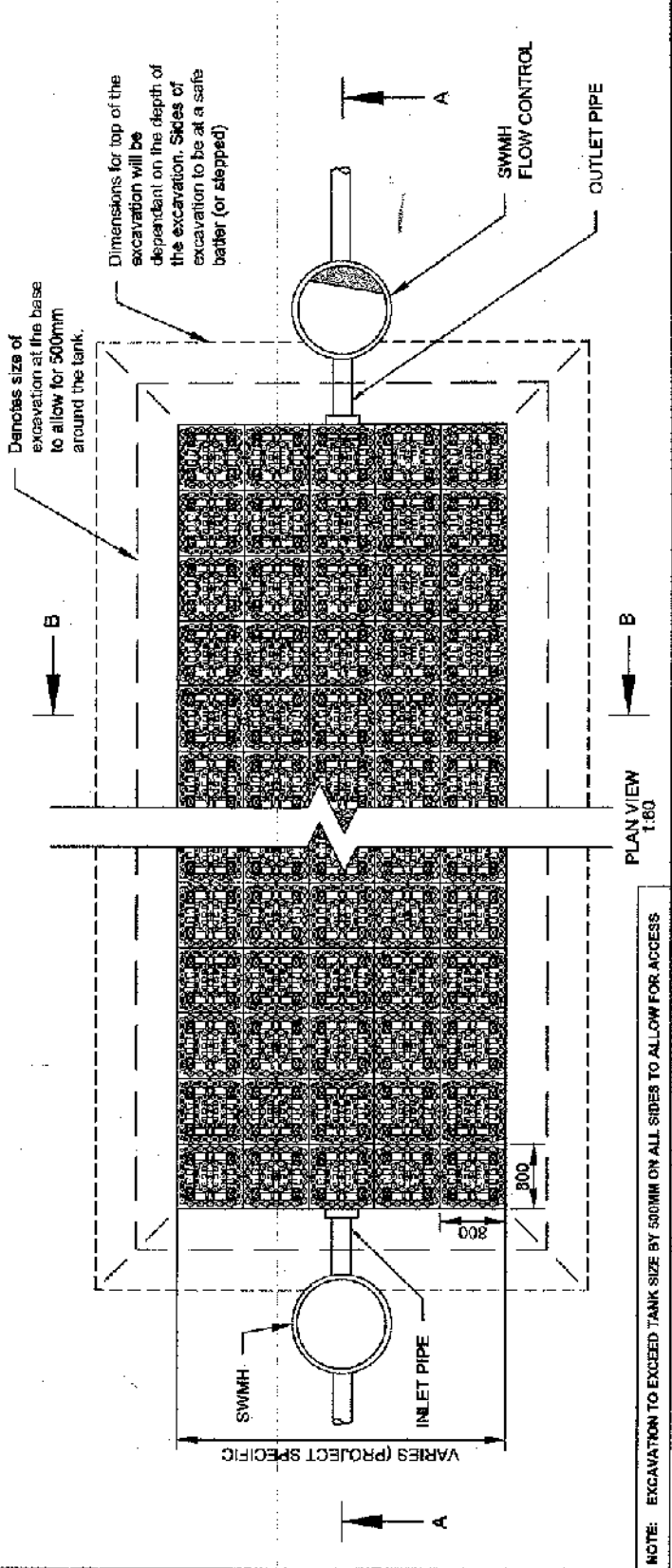
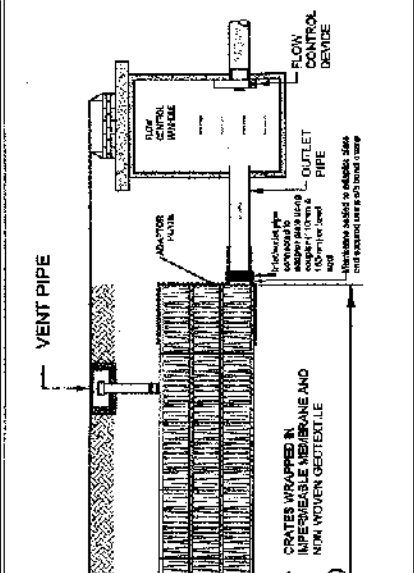
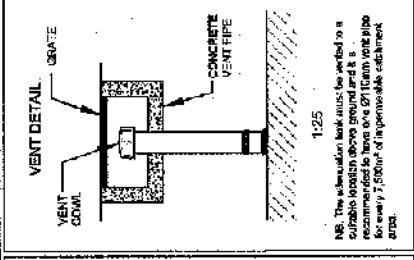
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PROJECT: **ATTENUATION TANK**
 using **GRAF ECOBLOC MAXX**

STANDARD DETAIL MAXX

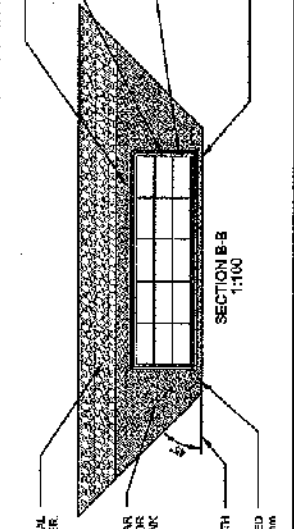
DRAWING NO. **P1**



INNER LAYER TO BE MIN THICK SIZED NON-ANGULAR STONE IMPERMEABLE MEMBRANE WITH OVERLAP OF 100mm TO ALL JOINTS TO BE ADHESIVE BOND TO FORM A WATER TIGHT SEAL.

OUTER LAYER TO BE 300mm (MIN) OVERLAP OF 800mm NON-WOVEN GEOTEXTILE.

UNDISTURBED EARTH BASE OF EXCAVATION. EXCAVATED AREA TO BE SMOOTH, FIRM AND LEVEL, FREE FROM LUMPS AND DEBRIS AND SUITABLE TO CARRY UNDISTURBED LOADS.



NOTE: EXCAVATION TO EXCEED TANK SIZE BY 500MM ON ALL SIDES TO ALLOW FOR ACCESS.

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- INSTALLATION METHOD:-**
- Excavate the trench with a wide batter (or stepped) ensuring the required slope is sufficient to ensure between tank and the sides. Minimum dimensions at side of the trench:
 - Lay into bottom of sloped no. angular stone
 - Gravelly as a base or sand. This can be laid to a maximum fill of 11".
 - Lay the Geotextile over the base of the excavation, overlapping any pipes by a minimum of 300mm.
 - Lay the Membrane on top of the Geotextile over the base and up the sides of the trench.
 - Membrane must be joined by thermal fusion based wedge welding. The recommendations for the dual beam method is used for the Membrane. The Membrane must be laid over the Geotextile and the Membrane and Geotextile must meet the specification stated on the drawing.
 - Assemble Ecobloc Maxx Crates and Baseplate, making sure the Membrane is not damaged by the Ecobloc Maxx Crates. The Crates will carry the corner observation. Push down firmly to ensure Crates is located correctly.
 - Install already assembled Crates and Baseplate into the membrane until the first layer is complete. Insert retaining clips if the Membrane is not fully seated.
 - To install the second layer of Crates remove from the stack and turn 90° and position directly above the Crates below. Push down firmly to ensure Crates is located correctly.
 - Continue until all Crates have been installed, ensuring clips are used to secure next Crates.
 - Remove the top of each Crates by notching the bottom in. Push them together firmly on the top section to locate into place.
 - Fit retaining plates to the sides of the crates in the required position for the inlet and outlet pipes.
 - Do it first in the Geotextile and fill it up the adjacent side to the Crates.
 - Remove the top of the Crates and Lay wrap the corner side of the Membrane up around the sides and Lay wrap the corner, securing the lid in place by heated wedge welding to the side cranks.
 - Cover the top and sides with Geotextile to protect the Geotextile.
 - Install the pipe connection into the top of the tank at a suitable angle.
 - Backfill around the tank and for 100mm above with non-angular stone. Backfill to a level ground with suitable material in layers.
 - Connect inlet/outlet pipes using appropriate hardware.
 - It is a good idea to pre-wet the soil around the tank to reduce the risk of shrinkage and cracking of the soil.
 - These should be regularly watered to avoid the failure of any soil.

N.B. Installation should only be carried out on days of the week and in the most suitable weather. For more information on installation methods please contact our Technical Department at Graf UK.

REV	DESCRIPTION	DATE	BY	DATE
P1	LATEST REVISION	04		15.08.10

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GRAF STANDARD DETAILS

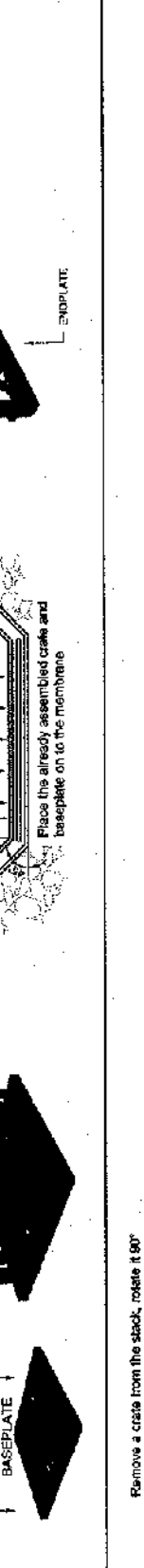
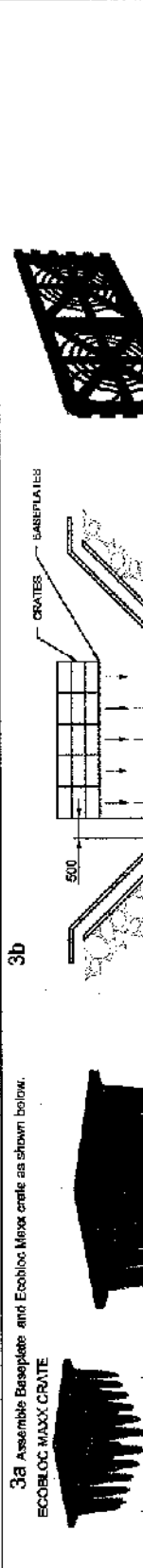
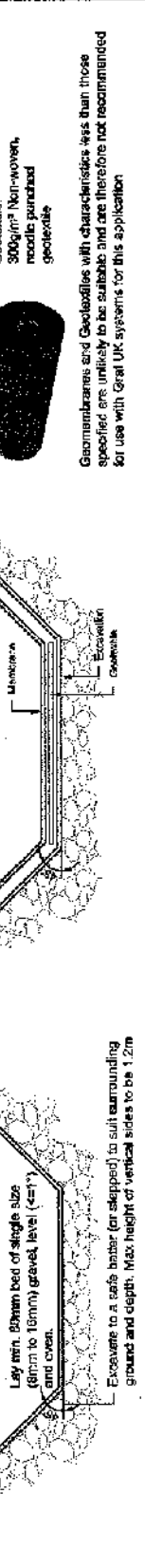
ATTENUATION TANK
 using **GRAF ECOBLOC MAXX**

DRAWING No. **REV.**
STANDARD DETAIL MAXX P2

Geomembrane: 1mm Thick LLDPE Geomembrane with a density of at least 0.955g/cm³.

Geotextile: 300g/m² Non-woven, needle punched geotextile.

Geomembranes and Geotextiles with characteristics less than those specified are unlikely to be suitable and are therefore not recommended for use with Graf UK systems for this application.



Excavation to suit surrounding ground and depth. Max height of vertical sides to be 1.2m.

Lay into bottom bed of single size (8mm to 16mm) gravel, level (±1%) and cover.

Lay the geotextile over the base of the excavation.

Lay the membrane on top of the geotextile over the base and up the sides of the trench.

Place the already assembled crate and baseplate on to the membrane.

Crates are then clipped to the tank where required.

Wrap the crates with the Membrane ensuring it is heat welded then wrap the top and sides with the geotextile to protect the membrane.

Single sized non-angular stone around sides of tank. Refer to Section 4.9.

Remove a crate from the stack, rotate it 90° and place on top of the previously placed crate ensuring the connector clips are clipped locking the crates together.

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GRAF SWM
O&M manual

Inspection & Maintenance of GRAF Underground Stormwater Tanks

The owner of the structure is responsible for maintenance.

For small soakaways/attenuation tank to individual houses, the only necessary maintenance of the system is to keep all 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 could reduce effectiveness. They should also be inspected after every major storm event.

It is recommended that silt traps, filters or other means of reducing the amount of silt and solids entering the system to a minimum, should be incorporated into the pipework at the inlet of the tank. There must be a maintenance plan that ensures regular cleaning of the trap to ensure correct performance.

For all flow control devices, it is sensible to incorporate access (via a manhole or similar) to the location of the pipe entry, orifice or vortex control. This will enable easy removal of any blockage. The orifice itself may be protected by a debris screen.

Paved surface areas above an installation should be inspected at the same time to ensure the units continue to provide the required structural support.

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 tank structure.

It is recommended that any system be inspected no less frequently than at monthly intervals for the first 3 months and thereafter at 6 monthly intervals. In addition, it is suggested that the installation is inspected immediately following the first storm event, whenever this should occur post installation.

Individual maintenance schedules should be drawn up using the information obtained from the initial inspections. It should also be noted that more regular inspections may be required should the catchpit(s) fill more frequently and/or if the initial inspections reveal that maintenance/cleaning will be required more regularly than at six month intervals.



OPERATION & MAINTENANCE REQUIREMENTS

Regular inspection and maintenance is required to ensure the effective long-term operation of below ground modular storage systems. Maintenance responsibility should be placed with a responsible organisation. Maintenance requirements for modular systems are described in Table 1.0 below.

Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements.

Table 1.0 Modular systems – operation and maintenance requirements

Maintenance schedule	Required action	Recommended frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Where rainfall infiltrates into blocs from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly (and after large storms)
	Remove sediment from pre-treatment structures, i.e. Silt Trap/Catchpit Manholes.	Annually, or as required
Remedial actions	Repair/rehabilitation of inlets, outlet, 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 and after large storms