NAYLOR
METROPAVE

MetroPave Grass & Gravel Grids

MetroPave
MetroPave Plus
MetroPave HGV

email: sales@naylor.co.uk web: www.naylor.co.uk

NAYLOR METROPAVE

MetroPave Grass & Gravel Grids

The Grids

Made from 100% recycled materials, the MetroPave grids are modular units which work in conjunction with neighbouring units to create an exceptionally durable, permanently porous, high load bearing structure when infilled with either grass or natural aggregate.

Range

The MetroPave range comprises three versions of ground reinforcement to suit almost all requirements:

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MetroPave is a light duty systems intended for domestic and pedestrian use.

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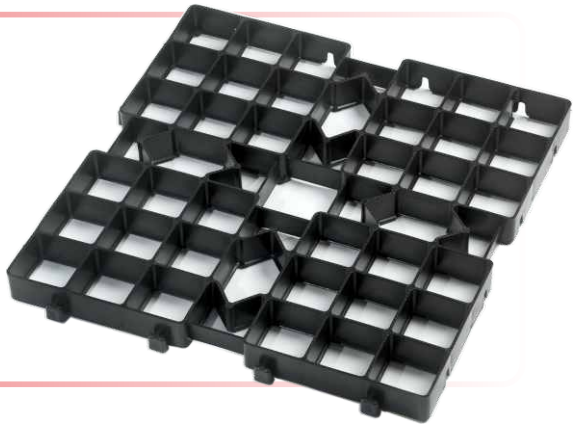
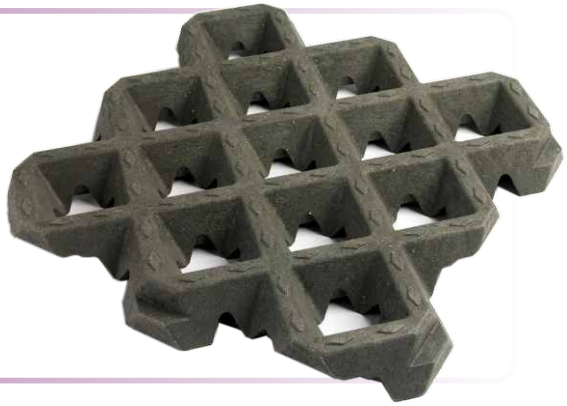
MetroPave Plus for general use such as commercial car parks where there is substantial use by light traffic.



NAYLOR METROPAVE HGV

MetroPave HGV for high traffic areas and frequent use by HGV traffic such as emergency access lanes, coach and lorry parks.



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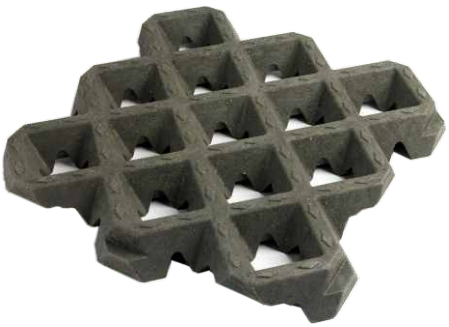
Applications

Applications	NAYLOR METROPAVE	NAYLOR METROPAVE PLUS	NAYLOR METROPAVE HGV
Garden paths	✓	✓	✗
Shed bases	✓	✓	✗
Domestic parking	✓	✓	✗
Pedestrian walkways	✓	✓	✗
Bridleways	✗	✓	✗
Equestrian	✗	✓	✓
Verge reinforcement	✓	✓	✓
Bank stabilisation	✓	✓	✓
Commercial car parks	✗	✓	✓
Overflow car parks	✗	✓	✓
Park & ride schemes	✗	✓	✓
Access roads	✗	✓	✓
Emergency access (>7.5T)	✗	✓	✓
Light aircraft taxiways	✗	✓	✓
Helipad	✗	✓	✓
Coach & truck parks	✗	✗	✓



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The Naylor MetroPave grid is Made from 100% recycled plastic and is designed to withstand loading found in domestic and pedestrian settings such as driveways, paths and shed bases. Units can be infilled with grass or gravel to suit the local environment and are fully SuDs compliant.

Suitable for:

- Garden paths
- Shed bases
- Domestic parking
- Pedestrian walkways
- Verge reinforcement
- Bank stabilisation

Product Code	65110
Dimensions (Installed)	480 x 480 x 40mm
Unit Weight	0.7kg (2.98 kg/m²)
Material	100% recycled HDPE/PP blend
Colour	Black
Connection	4 Interlocking lugs per side
Infiltration Rate	>5,000mm/hr
Quantity/m²	4.3
Infill Volume	0.034m³ per m²
Pallet Details	120/pallet(27.6m²) 1 x 1 x 1.2m (100kg)
Full Load details	48 pallets/load (1550m²)

Demarcation Blocks

Product Code	65120

These are available for the MetroPave & MetroPave Plus grids and are used to delineate parking spaces within car parking areas. Simply pushed into the grid squares the blocks will self-centre and secure against the sides of the grids. Clipless design means that if the spaces need to be moved or replaced, they can be levered up and easily removed. Fitting the blocks prior to the final infill of grass or gravel will avoid having to dig out the gravel in the required holes.

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METROPAVE PLUS

The Naylor MetroPave Plus grid is made from 100% recycled plastic, is designed to withstand higher and more regular loading compared to the standard MetroPave. The MetroPave Plus grid is intended for use in commercial car parks, and car access roads. It can withstand occasional HGVs loadings for emergency access. Units can be infilled with grass or gravel to suit the local environment and are fully SuDs compliant.

Suitable for:

- Garden paths
- Shed bases
- Domestic parking
- Pedestrian walkways
- Bridleways
- Equestrian
- Verge reinforcement
- Bank stabilisation
- Commercial car parks
- Overflow car parks
- Park & ride schemes
- Access roads

Product Code	65111PLUS
Dimensions (Installed)	500 x 500 x 40mm
Unit Weight	1.2kg (4.8 kg/m²)
Material	100% recycled HDPE/PP blend
Colour	Black
Connection	4 Interlocking lugs per side
Infiltration Rate	>5,000mm/hr
Quantity/m²	4
Infill Volume	0.035m³ per m²
Pallet Details	120/pallet (30m²) 1 x 1 x 1.2m (160kg)
Full Load details	48 pallets/load (1680m²)

Slopes and Pinning

MetroPave Plus grids can be laid on slopes of up to 15 degrees without additional pinning or staking. Where the grid is used on the underside of a bridge abutment (e.g. to comply with the HSE recommended limits) every unit should be staked, and the sand bed stabilised with a 12:1 cement mix on the 40 - 45 degree slope. Pinning the grids to stop lateral movement on slopes can be easily done with a U Shaped pin through the recessed central grid on the MetroPave Plus and on any of the recessed walls running across the centre of the MetroPave Plus grid. Edges can be pinned using a U pin over the extend interlock to secure the outermost edge.

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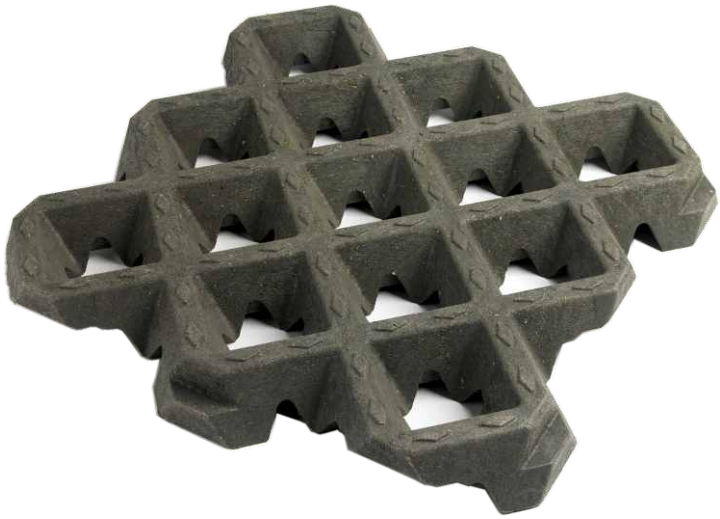
METROPAVE HGV

The MetroPave HGV grid is made from 100% recycled plastic, is very high load bearing and able to withstand the vigours of regular HGV traffic movements. Units can be infilled with grass or gravel to blend in with the local environment and are fully SuDs compliant.



Suitable for:

- Verge reinforcement
- Bank stabilisation
- Commercial car parks
- Overflow car parks
- Park and ride schemes
- Access Roads
- Emergency access
- Light aircraft taxiways
- Helipads
- Coach and truck parks

Product Code	65112HGV
Dimensions (Installed)	600 x 600 x 75mm
Unit Weight	10.7kg (29.7KG/m²)
Material	100% recycled mixed plastic
Colour	Grey
Loading (filled)	10,000kN/m²
Connection	Unit overlap - prevents uplift
Infiltration Rate	>4,000mm/hr
Quantity/m²	2.77
Infill Volume	0.034m³ per m²
Pallet Details	70/pallet(25.2m²) 1.2x 0.8x 2.2m (760kg)
Full Load details	31pallets/load (781m²)

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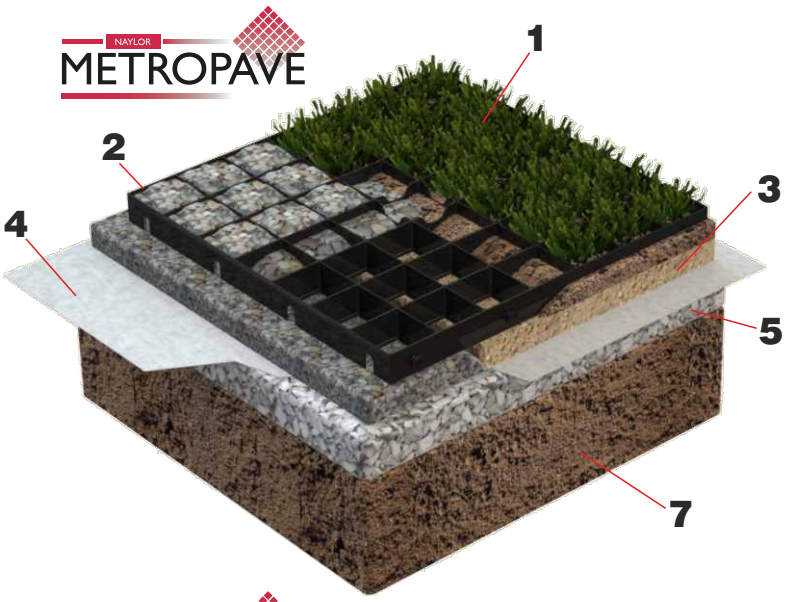
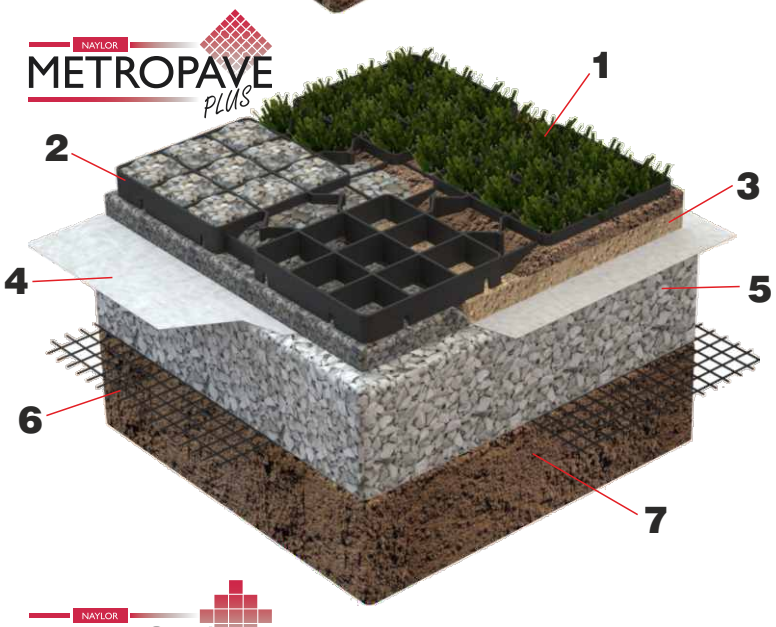
Installation guide





1 Finished surface, grass or gravel

2 Grid

3 Grid bedding material

4 Geotextile layer – non woven

5 Free draining sub-base 50-570mm

6 Geogrid

7 Sub-soil

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Step by step guide to installation

Excavation

1. Excavate the area to the required depth as decided in the sub-base design section. If required install the edging restraint such as kerbing or concrete edging.

   For systems where attenuation is required, lay a sealed geomembrane. No seal membrane is needed where infiltration is used. Place in sub-base being careful not to split membrane or dislodge the geotextiles. The sub-base needs to be porous, free draining and stable. Ideally it would be a Type 3 aggregate. Standard sub-base material is unsuitable due to the amount of fines within it stopping the water draining.

Geogrid

2. Once the excavated area is sufficiently leveled and high spots removed, we recommend installing a geogrid to improve the stability of the ground and reduce the risk of uneven settlement.

Free draining sub-base

3. Lay, screed and compact to level your sub-base, making sure to compact in layers ideally less than 150mm thick. Selection of the material to make the sub base should have been decided in the design section.

Geotextile

4. Once the sub-base has been laid and leveled, a geomembrane sheet should be installed as a separation layer. This stops the bedding layer from migrating or being washed away and causing sinkage or settlement.

Bedding

5. The bedding layer will differ depending on whether you require a gravel or grass finish.
   a. Gravel finish,

      The bedding layer should be a compacted 30mm layer of 5mm grit or sharp sand (we recommend using 5mm grit for heavier duty use)

   b. Grass finish,

      Mix either 5mm grit or sharp sand at a ratio 4:1 with a good quality top soil to ensure good root growth and lay a compacted 30mm layer.

Reinforcement layer

6. Once the area is compacted and prepared, lay the first layer of grids along the longest straight edge to align (if against kerbs or solid edging, leave a 15-25mm expansion gap).
   a. MetroPave & MetroPave Plus- grids will come on pallets as groups of 4, grids can be installed individually or connected together as groups of 4 to speed up installation. Grids can be cut with a hand saw or circular saw to fit the required area.
   b. MetroPave HGV- lay the HGV grid starting in the corner, laying the first grid with the side with the exposed 2 feet face out should help with locating the grids. Grids can be cut with a circular saw to fit around obstructions or edges.

   Standing on the existing grids while laying them will help avoid disturbing the bedding layer and causing subsidence.

Infill

7. The selected infill material should be specified on a project specific basis dependent upon the application and design requirements.

   Gravel infill:

   Fill the grids with 5-15mm angular gravel (rounded gravel or pea shingle is not recommended as it will migrate out of the grids during use) use a vibrating plate to compact the infill to a suitable level.

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Step by step guide to installation

For Grass infill:

Fill the grids with a good quality friable top soil or 60/40 root zone or preferably a blended high quality free-draining sandy loam. Scrape off any over fill so the top edge of the grid is visible.

Area should not be trafficked until the grass has established (Typically 8 weeks)

Suggested grass mixes:

General Parking:

- 50% Perennial ryegrass
- 20% Slender creeping red fescue
- 25% Strong creeping red fescue
- 5% Browntop bentgrass

Access ways:

- 30% Hard fescue
- 20% Chewings fescue
- 20% Slender creeping red fescue
- 25% Strong creeping red fescue
- 5% Browntop bentgrass

Verges:

- 35% Smooth stalked meadow grass
- 30% Slender creeping red fescue
- 25% Perennial ryegrass
- 10% Browntop bentgrass

Maintenance

For Grass Fill: Once the grass has established itself and traffic allowed back onto the area a normal grass maintenance regime can be introduced (mowing etc).

For Gravel Fill: Occasional sweeping of any overspill back into the units is all that is required for most areas that have been installed correctly. If gravel infill appears to be settling, check that the geotextile is installed beneath the sand to prevent migration & top up as required.

Breakages; If isolated breakages occur (miss use, wheel spinning etc) these individual units can be removed and replaced by removing the fill, levering up the locking pins from the affected & immediately adjacent units and removing any broken units. Smooth out the bedding to suit and replacement units can be levered into position and locked back into place. Replace the infill to blend the unit into the surrounding surface.

Installation Speeds

The following speeds are given as a guide only.

- **MetroPave**

  100m² per person per hour
- **MetroPave Plus**

  110m² per person per hour
- **MetroPave HGV**

  450m² per day with a 3 person team

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Sub-base design

Sub-grade assessment

The typical way to measure the strength of the soil is California Bearing Ratio (CBR), this rating should be obtained by testing. The table below gives typical strengths (CBR) for sub-grades found in the UK.

Initial steps

It's highly recommended that a site survey is done to establish what the site conditions are, as the sub-grade strength and soil characteristic are important to identify, so the correct construction depth is calculated to avoid pavement collapse or subsidence.

Table 1 Sub-grade assessment:

Consistency	Feel to touch	Visual	Mechanical	CBR%
Very Soft	Sample squeezable through fingers	Person standing will sink >75mm	<2	<1
Soft	Easily moulded by fingers	Person walking sinks 50-70mm	2-4	1
Medium	Moulded by moderate pressure from fingers	Person walking sinks 25mm	4-8	1-2
Firm	Moulded by strong finger pressure	Van/truck ruts 10-25mm	8-15	2-4
Stiff	Can't be moulded by fingers, indent able by thumb	Loaded HGV ruts 25mm	15-30	4-6

Table 2 Soil characteristic

Soil Classification	Coefficient of permeability (m/s)	Relative permeability	Typical CBR rating	SuDS infiltration suitability
Well graded gravels	10^{-5} to 10^{-3}	Pervious	30 to 80	Yes
Poorly graded gravels	$5x10^{-5}$ to 10^{-3}	Pervious	20 to 60	Yes
Well graded sands	$5x10^{-6}$ to 10^{-4}	Pervious	10 to 40	Yes
Poorly graded sands	$5x10^{-7}$ to 10^{-6}	Semi Pervious	10 to 40	Yes
Sandy clay	10^{-9} to 10^{-6}	Impervious	5 to 20	No
Silty clay	10^{-9} to 10^{-8}	Impervious	3 to 6	No
Heavy clay	10^{-10} to 10^{-8}	Impervious	2 to 5	No

Sub-base depths

Typical Use)	CBR (%) of sub-grade	Typical Depths	Typical depths if not using a Geogrid*
Shed bases	n/a	50	50
Patio & garden paths	n/a	100	100
Domestic car parking	n/a	100	100
Commercial car parking	>6	100	150
	4-6	100	180
	2-4	135	285
	1-2	260	570
Car access routes	>6	100	150
	4-6	100	150
	2-4	135	200
	1-2	260	390
Emergency access routes, heavy duty use (Inc. HGV & coach/bus parking, forklift and truck roadways, lay-bys and highway verge reinforcement)	>6	100	150
	4-6	120	180
	2-4	190	285
	1-2	380	570

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Sub-base material selection

Sub-base material is produced by crushing either limestone or granite rock.
The sub-base is designed to evenly spread the load on traffic bearing areas such as pavements and roads. Made up of a load-bearing layer of aggregate, the sub-base is laid on the sub-grade layer below. It is the main load-bearing layer in the construction of roads and pavements. The type of sub-base is extremely important for the longevity and quality of the highway. The sub-base distributes weight over a wide area, thus reducing settling of the surface. It's the interlocking nature of the sub-base particles that distribute the weight in multiple directions instead of directly downwards.

Type 3 sub-base Open Graded SHW Clause 805
Type 3 Open Graded SHW Clause 805 sub-base is a pure crushed stone, ranging in size from 40mm down to dust, but with a reduced (not zero) fines content.

Available both as a granite or limestone, Type 3 sub-base is widely used as a sub-base material for projects where a lower fine content is required for improved drainage. These include sports pitches, equestrian centres, driveway/hard standings and roads.

Soils and stone supply Type 3 Open Graded SHW Clause 805 sub-base quarried primary aggregate to comply with Highways Agency Clause 805 (SHW Clause 805).

40MM–75MM Clean Stone
Available as either granite or limestone, this is a crushed stone with no fines that ranges in size from 40mm–75mm. When compacted, it provides a hard-wearing and well-drained sub-base for use in roads, paths, drainage ditches, sport pitches, etc.

4 - 20MM SuDS Aggregate
4 – 20mm SuDS aggregate is an ideal upper sub-base material when creating any permeable solution. In addition it provides increased void space allowing even water storage.

10 - 63MM SuDS Aggregate
10 – 63mm SuDS aggregate is an ideal lower sub-base material when creating any permeable solution.
A clean, no fines angular stone provides a 30% void space and enhanced water storage capability when laid on the sub-grade.

Recycled sub-bases
The material for recycled sub-bases are drawn from crushed aggregates, such as concrete, hardcore, ballast and road planings that are removed from older sites and then recycled.

Recycled Type 3
Formerly known as Type 1 X, Type 3 uses a mix of clean, recycled aggregate. It is generally 40mm open-graded with reduced (not zero) fines, making it ideal for drainage.

TYPE 3 SUB-BASE OPEN GRADED SHW CLAUSE 805

40MM–75MM CLEAN STONE

4 - 20MM SUDS AGGREGATE

10 - 63MM SUDS AGGREGATE

RECYCLED TYPE 3

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SuDS the principle

SuDs are physical structures built to receive surface runoff, normally in the form of infiltration or attenuation solutions. They provide treatment of surfacewater by sedimentation, filtration, absorption and bio-degradation.

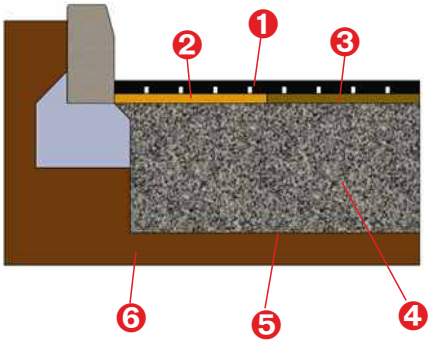
Permeable paving is expected to absorb 60mm/hr in the UK, all three MetroPave grids exceed these requirements. Managing the water once it has passed through the grids is an integral part of making a long lasting, good performing SuDs compliant system.

Generally there are 3 ways to manage the surface runoff:

Full infiltration

Where the existing sub-grade is free draining and allows the water to pass through with minimal pooling, a full infiltration system is suitable for the area. This allows the rain to filter down through the grids and sub-base into the existing ground, almost the same as before the grids were installed.

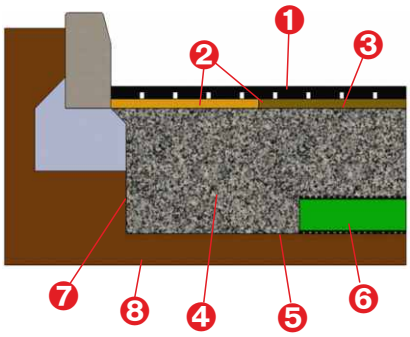
No water is discharged into the drainage or sewer systems making the area completely independent and the most cost effective way to make a structural and SUDs compliant area.



1.Grid
2.Bedding course
3.Geotextile
4.Permeable sub-base
5.Geogrid
6.Sub-grade

Attenuation

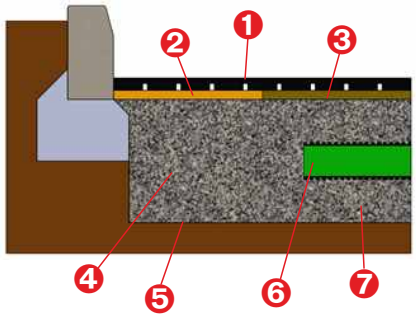
Where the existing sub-grades permeability is very poor in areas with lots of clay or is heavily polluted, the water must be totally captured and treated. This system uses an impermeable geotextile placed on top of the sub-grade to seal and separate it from the sub-base and form a storage tank out of the sub-base, an outlet must be installed to allow excess water to escape to water courses, sewer, drainage systems or further attenuation treatment areas.



1.Grid
2.Bedding course
3.Geotextile
4.Permeable sub-base
5.Geogrid
6.Drainage pipe
7.Impermeable geotextile
8.Sub-grade

Partial infiltration

Where the sub-grade can absorb most of the rainfall but has a bit of run off, a partial infiltration system is used to get as much of the rain to infiltrate into the local area but has a drain pipe installed within the sub-base to stop the rain water filling all the void. This will allow the excess rain water to be redirected to a secondary storage system such as a dedicated attenuation system or swale etc.



1.Grid
2.Bedding course
3.Geotextile
4.Permeable sub-base
5.Geogrid
6.Drainage pipe
7.Sub-grade

Full infiltration is always recommended and should be used in most cases.

Clay Drainage

Vitrified clay drainage systems for open cut and trenchless installation.
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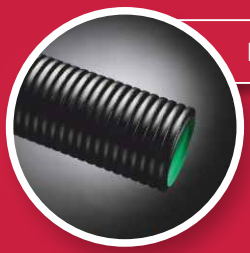

MetroDrain™

HDPE premium twin wall carrier/filter drainage system.

N-Drain™

HDPE agricultural twin wall carrier/filter drainage system.

Fabrications

Bespoke comprehensive fabrication service.

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Singlewall corrugated land drainage pipe.

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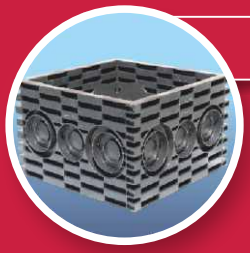
HDPE twin wall cable ducting.



MetroBox

Range of access chambers.

Environmental

Hard and soft SuDs solutions.

Naylor Industries plc - more than 130 years of production and supply to the Construction Industry

- Vitrified clay pipe systems for trench and trenchless installation
- Thermachem - Chemical Drainage and Industrial Ceramics
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Ref: NAYLOR METROPAVE 01/03/21 Rev. A