Linear Drainage Product Guide
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Why Choose Marshalls?

Marshalls plc is the UK’s leading hard landscaping company. We have achieved this status through progressive product innovation and by demonstrating outstanding service levels to our customers. This privileged position will be sustained by continuous investment in our brand, our products, and our people.

This dedication to excellence is exemplified by Marshalls commitment to developing a first class range of linear channel drainage products that fit even the most bespoke hydraulic system requirements.

Marshalls experience and expertise can ensure that the right system is selected, detailed, delivered and installed to give total peace of mind.

Marshalls pledges that all of the drainage products featured in this book comply with relevant industry standards, are manufactured to the highest standards, are fit for purpose and are designed to optimise savings in manufacture and use.

Marshalls’ purchasing policy sets out the standards and ethics by which we conduct our business and operate our management systems to manage our suppliers.

The majority of our products are manufactured in the UK; where products are sourced from outside the UK an ethical risk assessment is completed and an appropriate action plan agreed – multi-stakeholder independent social audits are part of our best practice. Marshalls is a member of both the Ethical Trading Initiative and UN Global Compact.

Marshalls accepts legal compliance as an absolute minimum standard to which we work and, where no legislation is in place, we use industry best practice. Legal compliance is monitored through our independently audited management systems. Our Board is ultimately responsible for ensuring the business operates in a socially responsible way, including compliance with relevant legislation.

We’re dedicated to creating spaces that make the world a better place for everybody – one pavement, one car park, and one city centre at a time.

Our vision is built upon four pillars: values by which our every decision is guided, no matter how big or small.

**Demonstrating leadership.**

We believe in driving the industry forward. It’s an ambition we’ve been acting on for 120 years, thanks to our size, capability, range of products and unmatched market knowledge.

**Delivering excellence.**

We have very high standards. Our products have to be innovative, our people have to be the best, our workmanship has to be perfect. Only then can we deliver the quality we’re renowned for, at every stage of the process.

**Building trust.**

Everyone at Marshalls acts with integrity, treating customers and their projects with care and respect. It means people trust us with their home, their business, their town. And it’s how we foster relationships for the long-term.

**Being sustainable.**

We use the world to source our products, so we have a responsibility to look after it. It’s something we have been committed to for over 120 years and has ensured our longevity. Whether it’s creating stronger communities, preserving environments, or contributing to the UN Global Compact, our work is always sustainable.

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Design Service & Project Support

Engineering Solutions

Marshall is committed to ensuring that the right system is selected, detailed, delivered and installed. The understanding that the right selection of linear drainage system is crucial to the function of any hard landscaped area therefore Marshalls Linear Drainage team will work in partnership with the specifier, engineer and contractor, to become an integrated part of the design process, helping transform and deliver ideas into hydraulic designs matched to the individual project requirements to give total peace of mind.

“In our everyday goal is simple – Support the customer’s performance and aesthetic design aspirations with a commercially driven, value added Design support service, excelling through computer aided drawings, engineered solutions and technical advice.”

Marshalls free, no-obligation Drainage Design Service encompasses the following services:

Flexible input options enable the user to generate required rainfall events in terms of duration and return period whilst also having the capability to adjust for climate change. These features ensure that each Marshall’s Linear drainage design can be tailored to meet the requirements of a specific project.

The Online Design Tool will:

• Work with the project team to ensure the client’s expectation are met
• Operate with either electronic (CAD) or hard copy drawings
• Assist in the selection of the most appropriate system
• Provide hydraulic data to support the adequacy of the selected system
• Provide schedule and / or layouts of the components as appropriate

In-House Design Support Services

By use of our bespoke computer software the Design Team can plan realistic and rapid solutions to your drainage needs. The Design Team will:

• Work with the project team to ensure the client’s expectation are met
• Operate with either electronic (CAD) or hard copy drawings
• Assist in the selection of the most appropriate system
• Provide hydraulic data to support the adequacy of the selected system
• Provide schedule and / or layouts of the components as appropriate

CPD Presentations and Training

Marshalls Linear Drainage Team provides free of charge comprehensive (Continuous Professional Development) seminars to architects, engineers and contractors.

Marshalls CPD seminars cover a whole range of water management topics and solutions from permeable paving to linear and combined kerb and drainage systems.

Technical Design Guide

The fully comprehensive Marshalls Linear Drainage Design Guide draws from Marshalls experience in linear drainage, and aims to help the reader to understand more about this subject in a comprehensive and easy to understand way.

The guide, walks the reader through all the Product Range, the case for linear drainage, cost comparisons, the product selection process and design principles. The guide also provides technical information, offering advice on design, installation, materials and maintenance.

Bespoke Solutions

Detailed design features often make the difference between good and great. Marshalls is always delighted to take challenging briefs for bespoke landscape linear drainage features.

Liverpool Lime Street Station required a discrete drainage solution to follow the curvature of the architecture. Marshalls was able to develop a True Radius Slot Drain to meet the clients requirements.

The client of the Welding Institute in Cambridge required a linear drainage solution for a multi story car park. Marshalls was able to recommend and supply Marshalls Birco Profil, a shallow steel channel designed for low construction heights whilst providing optimum drainage performance, reliable traffic safety and attractive design.

NEW Online Hydraulic Design Software

Marshalls bespoke software (the Online Design Tool) can enable you to plan realistic, precise and cost effective solutions to your drainage needs, all at your fingertips through a simple step-by-step process.

The software uses the Modified Rational Method as described in the Wallingford procedure to calculate appropriate runoff rates for your project. A simple procedure is followed to ensure selection of the correct Marshalls linear drainage system from a structural, aesthetic and hydraulic perspective.

360 Service Package

Our 360 Service Package provides comprehensive support including pre-construction appraisal, product sampling and CAD facilities. Marshalls Water Management and Hydraulic Engineering Consultants are on hand at all stages of planning and construction to help ensure sound hydraulic design and sustainable performance of the drainage installation. To smooth project management our construction service teams employ state of the art traffic planning software for real time tracking and priority delivery schedules. All of this is underpinned with RIBA accredited training seminars for project teams. Visit marshalls.co.uk/360 to find out how your project can benefit.

Further Technical documentation is also available;

• Conduit files
• Computer Aided Design product drawings
• Technical product data and specification sheets
• Declaration of performances in accordance with BS EN 1433:2002
• Maintenance and cleaning regimes
• Online installation guides & videos.

BIM & Product innovation

Marshalls is an early adopter of Building Information Modelling (BIM) and has invested heavily in developing our people and skills to create the appropriate BIM objects and data that large commercial projects will soon demand. The company is in the process of building a BIM object library that will be unparalleled in the Landscape sector and currently collaborates with relevant industry bodies to develop the training strategies, product data and software that will drive BIM adoption across the industry.

Available April 2016

www.marshalls.co.uk/commercial/water-management
Linear Drainage Product Guide

Decision Steps For Linear Drainage

Once the type of linear drainage system is determined, there are three decisions to make in order to select the right product for your requirement:

**STEP 1**
Hydraulic capacity - the volume of water expected to be removed, low, medium or high

**STEP 2**
Load Classification - what loading the drainage will be subjected to, conditional on the purpose of the scheme, ranging from pedestrian and cyclist to traffic with high wheel loads

**STEP 3**
Aesthetics - Marshalls provides a wider choice of finish than most whatever the purpose

### CHANNEL DRAINAGE

- **STEP 1 Capacity**
  - Low
  - Medium
  - High

- **STEP 2 Loading**
  - Hydraulic Capacity

- **STEP 3 Aesthetics**

### COMBINED KERB & DRAINAGE

- **STEP 1 Capacity**
  - Low
  - Medium
  - High

- **STEP 2 Loading**
  - Hydraulic Capacity

- **STEP 3 Aesthetics**

### Decision Steps Description

**CHANNEL DRAINAGE**

- **STEP 1 Capacity**
  - Low
  - Medium
  - High

- **STEP 2 Loading**
  - Hydraulic Capacity

- **STEP 3 Aesthetics**

**COMBINED KERB & DRAINAGE**

- **STEP 1 Capacity**
  - Low
  - Medium
  - High

- **STEP 2 Loading**
  - Hydraulic Capacity

- **STEP 3 Aesthetics**

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**Linear Drainage Overview**

**Product Selection**

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**Linear Drainage Overview**

**Product Selection**

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Steps 1 & 2 helps you to select the right channel to suit your capacity and loading requirement.

Choice depends on:

**Step 1** - Hydraulic capacity, from low to high

**Step 2** - Loading application from B125 to F900

Steps 1 & 2 - Choose Your Channel

**Drexus Driveline Drain**
- Available in 1000mm and 500mm lengths
- Invert width 100mm
- Available in 1000mm (70 Ø) and 900mm (100 Ø) run lengths
- Insert diameter 70mm Ø and 100mm Ø
- Rodding boxes, end caps, cap outlets and outfalls

**Drexus Channel**
- Available in 1000mm and 500mm lengths
- Invert width 100mm
- Available in 1000mm lengths
- Invert diameter 200mm Ø and 300mm Ø
- Rodding boxes, end caps, cap outlets and outfalls
- T-Junctions, end caps, cap outlets and outfalls
- Tops – Drexus Pave Drain, Drexus Slot Drain, cast iron grate tops

**Birco Shallow Channel**
- Available in 1000mm lengths
- Invert widths of 100, 150 and 300mm
- Available in 4 constant invert depths of 120 (5/8), 145 (6/8), 170 (7/8), 195 (11/16) and 225mm (7/8)
- 4 transition units, each 1000mm long
- T-Junctions, end caps, cap outlets and outfalls
- Transition units available
- Radius units available
- End caps, cap outlets, rodding boxes and outfalls
- Tops – concrete, cast iron and beany tops

**Birco 100 Channel**
- Available in 1000mm and 500mm lengths
- Invert width of 100mm
- Available in 1000mm lengths
- Invert width of 100mm
- Available in 4 constant invert depths of 177 (321 HB), 352 (502 HB), 196 (321 SP), 377mm (502 SP)
- Transition units available
- Centre stones and doppers available
- End caps, cap outlets, rodding boxes and outfalls
- Tops – cast iron and galvanised cast iron/steel grates

**Mono Beany**
- Available in 1000mm and 500mm lengths
- Invert width of 100mm
- Available in 4 constant invert depths of 177 (321 HB), 352 (502 HB), 196 (321 SP), 377mm (502 SP)
- Transition units available
- Centre stones and dippers available
- End caps, cap outlets, rodding boxes and outfalls

**Birco 150 Channel**
- Available in 1000mm and 500mm lengths
- Invert width of 150mm
- Available in 5 constant invert depths of 180 (0/0), 185 (5/0), 230 (10/0), 280 (15/0) and 330mm (20/0)
- 20 inbuilt fall channels with a gradient of 1%, each 1000mm long
- T-Junctions, end caps, cap outlets and outfalls
- Tops – cast iron and Mini Beany tops

**Traffic Drain & Mini Beany Channel**
- Available in 1000mm and 500mm lengths
- Available in 4 constant invert depths of 135 (210), 185 (260), 235 (310) and 280mm (360)
- Base transition units available
- Radius units available
- End caps, cap outlets and cover plates and outfalls
- Tops – cast iron and Mini Beany tops

**Birco 200 Channel**
- Available in 1000mm and 500mm lengths
- Invert width of 200mm
- Available in 4 constant invert depths of 240 (5/0), 265 (6/8), 290 (10/8) and 315mm (15/8)
- 20 inbuilt fall channels with a gradient of 1%, each 1000mm long
- T-Junctions, end caps, cap outlets and outfalls
- Tops – cast iron grate tops

**Max-E & Beany Channel**
- Available in 500mm lengths
- Available in 4 constant invert depths of 135 (210), 205 (295), 275 (365) and 335mm (550)
- Base transition units available
- Radius units available
- End caps, cap outlets, cover plates and outfalls
- Tops – concrete, cast iron and beany tops

**Drexus XL**
- Available in 2000mm lengths
- Invert width of 100mm
- Available in 5 constant invert depths of 505 (325), 548 (425), 580 (525), 610mm (625)
- 8 transition units each approx 478mm long
- End caps, chamber transitions and outfalls
- Tops – In-situ cast concrete

Choice depends on:

**Step 1** - Hydraulic capacity, from low to high

**Step 2** - Loading application from B125 to F900

Constructed from high performance concrete or medium density polyethylene, there’s a channel solution for every scheme.
### Linear Drainage Overview

#### Step 3 - Choose Your Top

Step 1 & 2 are very much predetermined by project specifics, however the choice of aesthetics, step 3, can be made with far more freedom.

The chart below shows the Drainage Top styles available for different linear base classifications.

Steps 1 & 2 are very much predetermined by project specifics, however the choice of aesthetics, step 3, can be made with far more freedom.
Marshalls Drexus Driveline Drain offers an attractive yet cost-effective concrete alternative to a traditional grated drainage system, suitable for public realm and domestic developments.

Drexus Driveline Drain is available in three colours to complement Marshalls’ popular Keyblok range to provide a smart homeowner or light commercial solution.
Drexus Driveline Drain

**A Constant Depth Channels**

<table>
<thead>
<tr>
<th>Constant Depth Channels</th>
<th>Colour</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Height (mm)</th>
<th>Bore Diameter (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
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<td>Brindle</td>
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<td>225</td>
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<td>12.4</td>
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</table>

Drexus Driveline Drain with reference numbers indicated in **bold** black are available ex-stock. Drexus Driveline Drain with reference numbers indicated in light are manufactured to order.

Contact our sales office to discuss your requirements.
Drexus Driveline Drain Installation Guide

1. Excavation
   a. Sufficient material should be excavated to accommodate the drainage channel, ancillaries, concrete bedding and backfilling.
   b. Any ‘soft spots’ or poorly compacted formation should be made good.

2. Setting Out
   a. The top of the Drexus Driveline Drain channel should be 5mm below the finished pavement surface.
   b. Setting out pins should be accurately located with a string line level and the upper edge of the channel set to the desired long fall.
   c. The line should be located to the rear of the channel to avoid having to lift the channel over the string line.
   d. The top of the Drexus Driveline Drain channel may be installed flush with the finished surface level of the adjacent pavement on Pedestrian (Class A15) applications only.

3. Outfalls general
   a. Starting at the downstream end, outfalls should be installed first.
   b. Sufficient material should be excavated to accommodate the outfall units and the outfall shall be bedded on concrete or mortar as per the standard detail.
   c. The outlet pipe shall be connected to the outfall chamber and cast into the concrete surround to form concrete ‘collar’ and a watertight seal.
   d. The top of the outfall unit should be 5mm below the finished pavement surface, but may be installed flush to the adjacent pavement for (Class A15) Pedestrian applications.

4. Installation
   a. Working away from the outlet chamber i.e., uphill, lay a bedding concrete of the appropriate thickness and depth as shown on typical installation drawings.
   b. Channels shall be laid onto the freshly mixed bedding concrete and the channel ends should abut together as tightly as possible to minimise the joint. Alternatively, the channels may be bedded on to a layer of 10 to 40mm cement mortar (812 mortar to BS EN 998-2) on a previously prepared concrete foundation.
   c. The blocks are laid one at a time and tapped in to place with a soft face mallet or similar, using the string line as a guide and a small spirit level can be used to adjust the level across the channel block.
   d. Changes in direction should be made at preformed junction access points, but where cutting is necessary, channels shall be cut so that no single unit is less than 100mm in length or cut in half on the diagonal from corner to corner. The units should be secured with a mechanical jaw mechanism and cut with an abrasive wheel (concrete saw or disc cutter) in accordance with manufacturer’s instructions.
   e. All channels should terminate in an access or rodding box. The access shall have sufficient material excavated to accommodate the drainage channel units as work proceeds.
   f. Should the cut channel be less than the recommended length, the make up length shall be achieved using multiple cut channel blocks. These may be spread evenly on the approach to the termination point.

5. Channel Joint Sealant
   a. To maintain a small joint, a thin coat of M Fer a, approx. 20mm wide and 2mm thick or 3mm bead of M Fer a sealant should be applied to the joint face of one block.
   b. This is then placed next to the previously installed channel block as described above.
   c. In both situations the sealant shall be placed centrally between the outside edge and internal channel orifice and shall extend as a minimum 10mm above the top of the channel orifice.
   d. Any surplus sealant shall be removed from the inner surface of the channel units as work proceeds.
   e. The inlet from the channel in to an outfall/rodding shall be formed using the same techniques.

6. Drexus Driveline Drain End Caps
   a. Where the Drexus Driveline Drain run does not terminate at an outfall, the base unit shall be sealed using the correct sized Drexus Driveline Drain End Cap.
   b. The End Cap shall be sealed as detailed above and securely placed against the vertical end of the base unit and haunched with concrete. Channels which do not terminate in an access point may be difficult to clean or maintain.

In accordance with the Health and Safety at Work etc. Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work related upper limb disorders. This may require the use of lifting aids to assist installation.

Marshalls NEW Drexus Pave Drain offers a unique aesthetic for linear drainage. Through our concrete expertise and heritage in natural stone, we have developed a drainage solution to complement our most popular paving products including premium concrete and natural stone. Drexus Pave Drain is available in a variety of finishes, suitable for any public realm development.

* Not suitable for public road carriageways or motorways
### A Tops

<table>
<thead>
<tr>
<th>Top</th>
<th>Loading</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Horizontal</th>
<th>Slot</th>
</tr>
</thead>
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<td>D480</td>
<td>508</td>
<td>160</td>
<td>80</td>
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### B Constant Depth Channels

<table>
<thead>
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<th>Constant Depth Channels</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Insert Width (mm)</th>
<th>Depth (mm)</th>
<th>Insert Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel 0/8</td>
<td>1000</td>
<td>108</td>
<td>154</td>
<td>104</td>
<td>37</td>
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</table>

Drexus Pave Drain with reference numbers indicated in **bold** black are available ex-stock. Drexus Pave Drain with reference numbers indicated in light are manufactured to order. Contact our sales office to discuss your requirements.

### C Channel Transitions

<table>
<thead>
<tr>
<th>Channel Transitions</th>
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Drexus Pave Drain Channels are available with transitions. Transition Channels increase drainage discharge capacity by improving flow rates and thereby increasing the overall discharge capacity of the system. Transition channels are 1000mm long.

### D Junction Channels

<table>
<thead>
<tr>
<th>Junction Channels</th>
<th>Unit Weight (kg)</th>
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<tbody>
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<tr>
<td>Junction Channel 0/8 RH</td>
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### E End Cap/Cap Outlets

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### F Outfall & Access Covers

<table>
<thead>
<tr>
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<td>Drexus Pave Access Cover (Low)</td>
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</table>

Contact our sales office to discuss your requirements.
Drexus Pave Drain Installation Guide

1. Excavation
   a. Sufficient material should be excavated to accommodate the drainage channel, concrete bedding and haunching.
   b. Any ‘soft spots’ or poorly compacted formation should be made good.

2. Setting Out
   a. The top of the Drexus Pave Drain should be 5mm below the finished pavement surface.
   b. It may be advantageous to use setting out pins and string lines to achieve the desired level for the channel.

3. Outfalls
   a. Drexus Pave Drain outfalls should be installed first.
   b. Sufficient material should be excavated to accommodate the trapped Drexus Pave Drain outfall units.
   c. 150mm of C25/30 mix (BS EN 998-1&2) concrete is placed in the bottom of the excavation.
   d. The bottom section of the two part outfall is lowered into position.
   e. Sufficient M Flex sealant is gunned into the top horizontal surface of the bottom section of the two part Drexus Pave Drain outfall so as to provide a seal between the top and bottom sections
   f. The bedding concrete should be laid and brought up level with underside of the pavement bedding course.
   g. The Access Cover & Frame Units should be set directly onto a 10mm bed of mortar (M12 mortar to BS EN 998-2:2003) along each side of the outfall unit.

4. Channel Installation
   a. Bedding concrete (C25/30 to BS EN 998-1&2) of the appropriate thickness and depth shall be laid.
   b. Channels shall be laid onto the freshly mixed bedding concrete, starting at the outfall i.e. working uphill, channel ends should be laid as tightly as possible.
   c. Alternatively, the channels may be bedded on to a layer of 10 to 40mm cement mortar (M12 mortar to BS EN 998-2) on a previously prepared concrete foundation.
   d. Where cutting is necessary, channels shall be cut so that the single Unit is less than 150mm in length.
   e. All cutting and trimming of the units shall be carried out with a concrete saw or disc cutter.

5. Channel Joint Sealant
   a. Jointing of channels shall occur prior to the fixing of the top units. A bead of M Flex sealant should be gunned into the groove formed when adjacent channels abut.
   b. Surplus sealant shall be removed from the inner surface of the units as work proceeds.

6. Top Block Installation
   a. The string line should be set to the level of the top corner of Units.
   b. A blockout, the units should be set directly onto a 10mm bed of mortar (M12 mortar to BS EN 998-2:2003).
   c. The Top Blocks should be tamped into position close to previously laid Units and the alignment checked.
   d. The levels should be checked using the string line and a spirit level.
   e. In addition, the general alignment should be checked from all directions as each block is laid. Any Unit deviating by more than 3mm in 1m from line and level shall be made good by lifting and relaying.
   f. The joints between adjacent top units are dry and units should be laid hand tight to achieve either a 6mm or 12mm opening as detailed on drawing
   g. Where cutting is necessary, one or two Units shall be cut to set so that no single Unit is less than 100mm in length. All cutting and trimming of the Units shall be carried out with a concrete saw or disc cutter.
   h. The Drexus Pave Drain top units should be protected during the construction phase to prevent debris entering the slots.

7. End Caps
   a. Where the Drexus Pave Drain run does not terminate at an outfall, the base unit shall be sealed using the correct sized Drexus Pave Drain End Cap.
   b. The End Cap shall be securely placed against the vertical end of the base unit and haunched with fresh concrete (C25/30 mix to BS EN 998-1&2).

In accordance with the Health and Safety at Work etc. Act 1974, the Manual Handling Operation Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work related upper limb disorders. This may require the use of lifting aids to assist installation.

Background
Thistle Street is located at the heart of Scotland’s capital city in Edinburgh’s New Town. Built in stages between 1767 and 1850, retaining much of the original neo classical and Georgian period architecture, the New Town is considered to be a masterpiece of city planning. Together with the Old Town, it was designated a UNESCO World Heritage Site in 1995.

Challenge
With pedestrian safety and comfort in mind, Edinburgh City Council engineers were seeking to improve drainage around the walkways in this essentially flat area, minimising the issues of ponding and standing water, creating effective channels and falls yet retaining the character of the city streets.

Solution
Marshalls Pave Drain providing the perfect solution, offering a unique aesthetic for linear drainage. Utilising expertise in both concrete and natural stone, Pave Drain provides an effective combined paving and drainage solution which perfectly complements natural stone paving materials, including the Scoutmoor Yorkstone installed on Thistle Street.

Available in a variety of designs and finishes, suitable for any public realm development, the Pave Drain concept combines a natural stone upper section complete with drainage slots with a concrete channel block which sits below the upper section, allowing surface water to drain away below the surface of the walkway.

Pave Drain achieves a loading classification of D400, making it suitable for areas subject to vehicular overrun as well as pedestrian traffic, helping to create better and appropriate landscapes for some of Britain’s most iconic sites.

Benefit
Devetailing perfectly with existing hard landscaping products along Thistle Street, Marshalls Pave Drain is now playing an important role in maintaining safe and well-drained pedestrian walkways serving the shops and restaurants in this busy and popular area of Edinburgh.
For the Athletes’ Village - one of the most significant new urban developments in the UK – Marshalls supplied Slot Drain Channel system to complement the range of high quality natural stone paving products also supplied by the company for this prestigious site. Slot Drain is a highly effective yet beautifully discreet solution for surface water removal on premium landscapes. Marshalls NEW Drexus Slot Drain is a highly effective yet beautifully discreet solution for surface water removal on premium landscapes. Marshalls New Drexus 100 channel is hidden beneath a slimline galvanised steel slot which features a mono or duo linear aperture. Perfect for complementing block or flag installations and particularly suited to Natural Stone landscapes, Drexus Slot Drain is suitable for an array of applications and public realm developments.

**Background**

Dubbed the construction project of the century, building the Olympic Park created not only a world class venue for the Games, but in the legacy phase a whole new London district. Marshalls is proud to have supplied a wide range of materials to the project and played a role in ensuring the project was completed on time to deliver one of the most successful Games of the modern age.

**Challenge**

The ODA’s Procurement Policy demanded that sustainability credentials as well as good value and high quality were paramount for any company wishing to become a supplier to the Games. As well as guaranteeing high quality solutions, suppliers were required to deliver large quantities of materials within tight time periods, meeting complex security requirements.

**Solution**

The Marshalls offer for the Olympic Park included full schedules for the quantities of different products required for each phase of the scheme, full design service for the slot drainage system, carbon footprint for all materials used and full sustainability qualification documentation. In addition, Marshalls provided a dedicated on site support team for the construction period and logistical support complying with the site Delivery Management System (DMS) booking in and security system.

The Olympic Park Roads & Bridges contract covered the road infrastructure project for the main Olympic Park. To gain a specification for the linear drainage systems and kerb units, Marshalls worked closely with the designers from a very early stage. Marshalls Beany Block, the original combined kerb and drainage system, was selected for this section of the project. For the North and South Security Plazas and the high profile Aquatics Centre designed by architect Zaha Hadid, Marshalls supplied high quality Birco linear drainage systems.

Marshalls NEW Drexus Slot Drain is a highly effective yet beautifully discreet solution for surface water removal on premium landscapes. Marshalls New Drexus 100 channel is hidden beneath a slimline galvanised steel slot which features a mono or duo linear aperture. Perfect for complementing block or flag installations and particularly suited to Natural Stone landscapes, Drexus Slot Drain is suitable for an array of applications and public realm developments.
### A Top Units

<table>
<thead>
<tr>
<th>Top Units Loading</th>
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<td>580 116 105</td>
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<td>DEXUS Mono Duo</td>
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<td>4.25</td>
<td>580/116/105</td>
<td>D5454650</td>
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</table>

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### B Constant Depth Channels

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Drexus Slot Drain Channels are available with transitions. Transition Channels increase drainage discharge capacity by improving flow rates and thereby increasing the overall discharge capacity of the system. Transition channels are 1000mm long.

### C Junction Channels

<table>
<thead>
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<td>Junction Channel 100/4</td>
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### D Channel Transitions

<table>
<thead>
<tr>
<th>Channel Transitions</th>
<th>Length (mm)</th>
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<th>Insert Depth (mm)</th>
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<th>Item Code</th>
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<td>154 154</td>
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<td>15/0 - 20/0</td>
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</table>

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### E End Cap/Cap Outlets

<table>
<thead>
<tr>
<th>End Cap/Cap Outlets</th>
<th>Unit Weight (kg)</th>
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<td>End Cap 15/0</td>
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</table>

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### F Outfall & Access Covers

<table>
<thead>
<tr>
<th>Outfall &amp; Access Covers</th>
<th>Unit Weight (kg)</th>
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<td>End Outfall</td>
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</table>

Drexus Slot Drain with reference numbers indicated in bold black are available ex-stock. Drexus Slot Drain with reference numbers indicated in light are manufactured to order. Contact our sales office to discuss your requirements.
Drexus Slot Drain Installation Guide

1. Excavation
a. Sufficient material should be excavated to accommodate the drainage channel, concrete bedding and haunching.
b. Any ‘soft spot’ or poorly compacted formation should be made good.

2. Setting Out
a. The top of the Drexus Slot Drain should be 5mm below the finished pavement surface.
b. It may be advantageous to use setting out pins and string lines to achieve the desired level for the channels.

3. Outfalls
a. Drexus Slot Drain outfalls should be installed first.
b. Sufficient material should be excavated to accommodate the trapped Drexus Slot Drain outfall units.
c. 150mm of C35/30 mix to BS 8500-1&2 concrete is placed in the bottom of the excavation.
d. The bottom section of the two part outfall is lowered into position.
e. Sufficient M Flex sealant is gunned in onto the horizontal surface of the bottom section of the two part Drexus Slot Drain outfall so as to provide a seal between the top and bottom sections.
f. The top section of the two part Drexus Slot Drain outfall is lowered into position.
g. The bedding concrete should be laid and brought up level with the underside of the pavement bedding course.
h. The Access Cover & Frame Units should be set directly onto a 10mm bed of mortar with mortar Class 12 to BS EN 998-2:2003 along each side of the outfall unit.

4. Channel Installation
a. Bedding concrete (C25/30 to BS 8500-1&2) of the appropriate thickness and depth shall be laid.
b. Channels shall be laid onto the freshly mixed bedding concrete, starting at the outfall; a working uphill, channel ends should about as tightly as possible.
c. Alternatively, the channels may be bedded on to a layer of 10 to 40mm thick, concrete saw or disc cutter.
d. Where cutting is necessary, channels shall be cut so that no single unit is less than 350mm in length.
e. All cutting and trimming of the Units shall be carried out with a concrete saw or disc cutter.

5. Channel Joint Sealant
a. Jointing of channels shall occur prior to the fixings of the top units. A bead of M Flex sealant should be gunned in to the groove formed when adjacent channels abut.
b. Suplus sealant shall be removed from the inner surface of the Units, as work proceeds.

6. Top Unit Installation
a. The string line should be set to the level of the top corner of Units.
b. Again, starting at the outfall, the units should be dry laid onto the channel, use a mortar bed for levelling purposes, if required to class 12 from BS EN 998-2:2003.
c. The top units should be tamped into position close to previously laid units and the alignment checked.
d. The levels should be checked using the string line and a spirit level.
e. In addition, the general alignment should be checked from all directions as each unit is laid. Any Unit deviating by more than 3mm in 3m from line and level shall be made good by lifting and relaying.
f. The joints between adjacent top units should be sealed with Marshalls M Tape to prevent ingress of bedding material from the surrounding pavement.
g. Where cutting is necessary, one or two units shall be cut so that no single unit is less than 350mm in length. All cutting and trimming of the Units shall be carried out with a concrete saw or disc cutter.
h. Any cut galvanised steel shall be renovated using Defcon Z or similar approved material.

7. End Caps
a. Where the Drexus Slot Drain run does not terminate at an outfall, the base unit shall be sealed using the correct sized Slot Drain End Cap.
b. The End Cap shall be securely placed against the vertical end of the base unit and haunched with fresh concrete (C25/30 mix to BS 8500-1&2).

8. Pavement Installation
a. Where Drexus Slot Drain is being laid adjacent to flexibly laid paving the inlet apertures should be sealed against ingress of bedding or jointing material during the construction phase.

In accordance with the Health and Safety at Work etc Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work-related upper limb disorders. This may require the use of lifting aids to assist installation.

Marshalls NEW Drexus 100 is a cost effective lighter weight linear drainage system providing loading of up to D400 when used with the range of Drexus 100 cast iron grates. With wall thicknesses of just 30mm, and its scalloped side walls this unit is the lightest within the Marshalls channel range.

Available for both pedestrian and standard traffic applications, making it suitable for a variety of projects including civic, commercial and rail applications.

Drexus 100
Grid Drainage System

www.marshalls.co.uk/commercial/water-management
Drexus 100

**A. Gratings**

<table>
<thead>
<tr>
<th>Gratings</th>
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**B. Constant Depth Channels**

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**C. T Junction Channels**

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**D. Channel Transitions**

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<th>Insert Depth (mm)</th>
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**E. End Cap/Cap Outlets**

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<td>Cap Outlet 10/0</td>
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**F. Outfalls**

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<td>End Outfall</td>
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Drexus 100 Channels are available with transitions. Transition Channels increase drainage discharge capacity by improving flow rates and thereby increasing the overall discharge capacity of the system. Transition channels are 1000mm long.

Drexus 100 with reference numbers indicated in **bold** black are available ex-stock. Drexus 100 with reference numbers indicated in light are manufactured to order. Contact our sales office to discuss your requirements.
Drexus 100 Installation Guide

1. Excavation
a. Sufficient material should be excavated to accommodate channel units, concrete bedding and haunching.
b. Any ‘soft spots’ or poorly compacted formation should be made good.

2. Setting Out
a. Setting out pins should be accurately located to the correct line and level with a string line level with the top rear corner of the channel units.
b. It may be advantageous to locate setting out pins to the rear of the units to avoid having to lift the units over the string line.

3. Outfalls
a. Drexus Outfalls should be installed first.
b. Sufficient material should be excavated to accommodate the trapped Drexus Gulley.

c. 150mm of C25/30 mix (BS 8500-1&2) concrete of the appropriate mix is placed in the bottom of the excavation.

d. The bottom section of the two part Drexus Gulley is lowered into position, with the appropriate pipe adaptor placed the aperture for connection to the underground pipework.

e. A suitable section of the wall of the outfall unit shall be cut out to allow adjacent drainage channels to abut without restricting the flow of water.

4. Channel Installation
a. Bedding concrete of the appropriate thickness and depth shall be laid as specified in the Drexus Standard Detail Sheet.
b. The top of the Drexus Channel shall be 5mm below the specified level dependant on surface finish as shown in the Drexus 100 Standard Detail Sheet.
c. The bedding concrete should be laid and brought up to the appropriate level dependent on surface finish as shown in the Drexus Standard Detail Sheet.

d. Alternatively, the Channel Units may be bedded on to a layer of 10 to 40mm cement mortar (M12 mortar to BS EN 998-2) on a previously prepared concrete foundation.
e. The concrete haunching shall be of a concrete grade appropriate to the Drainage Channel Loading Class as specified in the Drexus Standard Detail Sheets.

5. Channel Joint Sealant
a. Jointing of adjacent channel shall be carried prior to fixing the gratings.
b. Marshall M-Flex sealant shall be gunned into the sealant groove formed when adjacent channels abut.

c. Surplus sealant shall be removed from the inner surface of the units as work proceeds.

6. Grating Installation
a. Adjacent Carriageway and/or footway construction shall not be commenced within 3 days of any jointing or haunching surrounding concrete being placed.
b. Drexus gratings shall be securely bolted to Drexus Channel Units, before adjacent pavement construction is commenced.
c. All gratings shall be evenly spaced with bolts tightened down securely to the appropriate torque (25Nm).

d. On completion of the works, the drainage channel units shall be cleaned out and left free from obstruction. This shall be carried out either by removal of gratings or by high pressure water jetting (100-150 bar at 200l/min minimum). Unless otherwise agreed with the specifier, the slot openings shall be covered by timber boards or other method during jetting operations.

e. Outfall units shall be emptied.

7. End Caps/End Cap Outlets
a. Where the Drexus Channel run does not terminate at an outfall, the base unit shall be sealed using the Drexus Block End Cap or End Cap Outlet.
b. These are to be held in position by installing 150mm of concrete haunching.

c. Marshall M-Flex sealant should be gunned into the sealant groove.

8. Setting Out: Outfalls
a. Setting out pins should be accurately located to the correct line and level with a string line level with the top rear corner of the channel units.
b. It may be advantageous to locate setting out pins to the rear of the units to avoid having to lift the units over the string line.

c. The Drexus Outfall shall be installed first.

d. Sufficient material should be excavated to accommodate the trapped Drexus Gulley.

e. 150mm of C25/30 mix (BS 8500-1&2) concrete of the appropriate mix is placed in the bottom of the excavation.

9. Excavation
a. The bottom section of the two part Drexus Gulley is lowered into position, with the appropriate pipe adaptor placed the aperture for connection to the underground pipework.
b. A suitable section of the wall of the outfall unit shall be cut out to allow adjacent drainage channels to abut without restricting the flow of water.

c. Cutting shall be achieved by using a concrete saw or disc cutter.

10. Canal Joint Sealant
a. Jointing of adjacent channel shall be carried prior to fixing the gratings.
b. Marshall M-Flex sealant shall be gunned into the sealant groove formed when adjacent channels abut.

c. Surplus sealant shall be removed from the inner surface of the units as work proceeds.

11. Grating Installation
a. Adjacent Carriageway and/or footway construction shall not be commenced within 3 days of any jointing or haunching surrounding concrete being placed.
b. Drexus gratings shall be securely bolted to Drexus Channel Units, before adjacent pavement construction is commenced.
c. All gratings shall be evenly spaced with bolts tightened down securely to the appropriate torque (25Nm).

d. On completion of the works, the drainage channel units shall be cleaned out and left free from obstruction. This shall be carried out either by removal of gratings or by high pressure water jetting (100-150 bar at 200l/min minimum). Unless otherwise agreed with the specifier, the slot openings shall be covered by timber boards or other method during jetting operations.

e. Outfall units shall be emptied.

12. End Caps/End Cap Outlets
a. Where the Drexus Channel run does not terminate at an outfall, the base unit shall be sealed using the Drexus Block End Cap or End Cap Outlet.
b. These are to be held in position by installing 150mm of concrete haunching.

c. Marshall M-Flex sealant should be gunned into the sealant groove.

In accordance with the Health and Safety at Work etc Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work-related upper limb disorders. This may require the use of lifting aids to assist installation.
Birco 100

Channel Drainage Product Range

Birco 100 Channels are available with inbuilt falls. Inbuilt fall channels increase drainage discharge capacity by improving flow rates and thereby increasing the overall discharge capacity of the system. Inbuilt fall channels are 1000mm long.

Inbuilt Fall

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Invert Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
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<td>1000</td>
<td>200</td>
<td>100</td>
<td>180/190</td>
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<td>190/200</td>
<td>110/120</td>
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<td>100</td>
<td>210/220</td>
<td>130/140</td>
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Constant Depth

Channels

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Inbuilt Fall Channels

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Outfalls

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<td>DR080130</td>
</tr>
</tbody>
</table>

Gratings

<table>
<thead>
<tr>
<th>Grating</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Invert Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>E600</td>
<td>600</td>
<td>180</td>
<td>100</td>
<td>180/190</td>
<td>100/110</td>
<td>DR080100</td>
</tr>
<tr>
<td>E600</td>
<td>600</td>
<td>180</td>
<td>100</td>
<td>180/190</td>
<td>100/110</td>
<td>DR080105</td>
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<tr>
<td>E600</td>
<td>600</td>
<td>180</td>
<td>100</td>
<td>180/190</td>
<td>100/110</td>
<td>DR080110</td>
</tr>
<tr>
<td>E600</td>
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<td>100</td>
<td>180/190</td>
<td>100/110</td>
<td>DR080115</td>
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<tr>
<td>E600</td>
<td>600</td>
<td>180</td>
<td>100</td>
<td>180/190</td>
<td>100/110</td>
<td>DR080120</td>
</tr>
<tr>
<td>E600</td>
<td>600</td>
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<td>180/190</td>
<td>100/110</td>
<td>DR080125</td>
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<tr>
<td>E600</td>
<td>600</td>
<td>180</td>
<td>100</td>
<td>180/190</td>
<td>100/110</td>
<td>DR080130</td>
</tr>
</tbody>
</table>

Contact our sales office to discuss your requirements.
1. Excavation
   a. Sufficient material should be excavated to accommodate channel units, concrete bedding and haunching.
   b. Any ‘soft spots’ or poorly compacted formation should be made good.

2. Setting Out
   a. Setting out positions should be accurately located to the correct line and level with a string line level with the top rear corner of the channel unit.
   b. It may be advantageous to locate setting out points to the rear of the units to avoid having to lift the units over the string line.

3. Outfalls
   a. Birco Outfalls should be installed first.
   b. Sufficient material should be excavated to accommodate the trapped Birco Gulley.
   c. 150mm of 1:4 mix (BS 8500-1&2) concrete of the appropriate mix is placed in the bottom of the excavation.
   d. The bottom section of the two part Birco Gulley is lowered into position, with the appropriate pipe adaptor placed the aperture for connection to the underground pipework.
   e. A suitable section of the wall of the outfall unit shall be cut out to allow adjacent drainage channels to flow without restricting the flow of water. Cutting shall be achieved by using a concrete saw or disc cutter.
   f. Sufficient M-Flex sealant is gunned onto the top horizontal surface of the cutout section of the outfall unit.
   g. The top section of the two part Birco Gulley is lowered into position.
   h. The bedding concrete should be laid and brought up to the appropriate level dependant on surface finish as shown in the Birco Standard Detail Sheet.
   i. The concrete bedding shall be of a concrete grade appropriate to the Drainage Channel Loading Class as specified in the Birco Standard Detail Sheets.
   j. The bedding concrete shall be placed to the dimensions indicated in the Birco Standard Detail Sheets.

4. Channel Installation
   a. Bedding concrete (ST1 to BS 8500-1&2) of the appropriate thickness and depth shall be laid as specified in the Birco Standard Detail Sheets.
   b. The top of the Birco Channel shall be 5mm below the final pavement surface.
   c. Channel Units shall be laid onto the freshly mixed bedding concrete, starting at the outfall, i.e. working uphill.
   d. Alternatively, the Channel Units may be bedded on to a layer of 10 to 40mm cement mortar (M12 mortar to BS EN 998-2) on a previously prepared concrete foundation.
   e. The concrete haunching shall be formed using a concrete grade appropriate to the Drainage Channel Loading Class as specified in the Birco Standard Detail Sheets.
   f. Haunching shall be carried out as one operation to a complete line of Channel Units, to the dimensions indicated in the Birco Standard Detail Sheets.
   g. Where channels are laid on or adjacent to existing or proposed concrete slabs, transverse joints shall be formed within the units and haunching adjacent to the slab joints.
   h. Longitudinal movement joints shall also be formed between the haunching and the slabs as described in the Birco Drain Standard Detail Sheets.
   i. Where cutting the Birco Channel Units is required, they shall be cut with a concrete saw or disc cutter, so that no single Unit is less than 350mm long. Birco gratings shall not be cut unless directed by the engineer. Any cut galvanised steel shall be renovated using Defcon Z, or similar approved.

5. Channel Joint Sealant
   a. Jointing of adjacent channels shall be carried out prior to fitting the gratings. Marshalls M-Flex sealant should be gunned into the sealant groove formed when adjacent channels abut.
   b. Surplus sealant shall be removed from the inner surface of the units as work proceeds.

6. Grating Installation
   a. Adjacent Carriageway and/or footway construction shall not be commenced within 5 days of any jointing or haunching/surrounding concrete being placed.
   b. Birco gratings shall be securely bolted to Birco Channel Units, before adjacent pavement construction is commenced.
   c. All gratings shall be evenly spaced with bolts tightened down securely to the appropriate torque (Lite: 25Nm, 100, 150 and 200: 75Nm, 150, 200: 100Nm).
   d. On completion of the works, the drainage channel units shall be cleaned out and left free from obstruction. This shall be carried out either by removal of gratings or by high pressure water jetting (100-150 bar at 200 litres/min minimum). Unless otherwise agreed with the specifier, the slot openings shall be covered by timber boards or other method during jetting operations.
   e. Outfall units shall be emptied.
   f. The cleaning process should be repeated where necessary on completion of any remedial works.

7. End Caps/End Cap Outlets
   a. Where the Birco Channel run does not terminate at an outfall, the base unit shall be sealed using the Birco End Cap or End Cap Outlet.
   b. These are to be held in position by installing 150mm of concrete haunching.
   c. Marshalls M-Flex sealant should be gunned into the sealant groove.

In accordance with the Health and Safety at Work etc Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work-related upper limb disorders. This may require the use of lifting aids to assist installation.

Scan the QR Code to watch the installation video
**Birco 150**

### A. Gratings

<table>
<thead>
<tr>
<th>Gratings</th>
<th>Loading</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Junction Cast Iron</td>
<td>C250</td>
<td>500</td>
<td>400</td>
<td>4.5</td>
<td>DR185260</td>
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<tr>
<td>T-Junction Cast Iron</td>
<td>C650</td>
<td>500</td>
<td>400</td>
<td>6.5</td>
<td>DR185270</td>
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<tr>
<td>T-Junction Cast Iron</td>
<td>C850</td>
<td>500</td>
<td>400</td>
<td>8.5</td>
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<tr>
<td>T-Junction Cast Iron</td>
<td>C1050</td>
<td>500</td>
<td>400</td>
<td>10.5</td>
<td>DR185290</td>
</tr>
</tbody>
</table>

Birco 150 with reference numbers indicated in **bold** black are available ex-stock.

Birco 150 with reference numbers indicated in light **gray** are manufactured to order.

Contact our sales office to discuss your requirements.

### B. Constant Depth Channels

<table>
<thead>
<tr>
<th>Constant Depth Channels</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Invert Width (mm)</th>
<th>Depth (mm)</th>
<th>Invert Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel 0/0</td>
<td>1000</td>
<td>250</td>
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<td>230</td>
<td>180</td>
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<td>DR170200</td>
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<tr>
<td>Channel 5/0</td>
<td>1000</td>
<td>250</td>
<td>150</td>
<td>280</td>
<td>230</td>
<td>7.5</td>
<td>DR170205</td>
</tr>
<tr>
<td>Channel 10/0</td>
<td>1000</td>
<td>250</td>
<td>150</td>
<td>330</td>
<td>280</td>
<td>9.5</td>
<td>DR170210</td>
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</table>

### C. T-Junction Channels

<table>
<thead>
<tr>
<th>T-Junction Channels</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
</table>

| T-Channel 90 | 3.8 | DR195220 |
| T-Channel 90 | 4.4 | DR195230 |
| T-Channel 90 | 5.0 | DR195240 |

**Birco 150**

### D. Inbuilt Fall Channels

<table>
<thead>
<tr>
<th>Inbuilt Fall Channels</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Insert Width (mm)</th>
<th>Depth (mm) Upstream/ Downstream</th>
<th>Insert Depth (mm) Upstream/ Downstream</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BF Channel 1</td>
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<td>150</td>
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<td>180/190</td>
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<tr>
<td>BF Channel 2</td>
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<td>250</td>
<td>150</td>
<td>280/290</td>
<td>230/240</td>
<td>8.8</td>
<td>DR180205</td>
</tr>
<tr>
<td>BF Channel 3</td>
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<td>250</td>
<td>150</td>
<td>330/340</td>
<td>280/290</td>
<td>9.8</td>
<td>DR180210</td>
</tr>
</tbody>
</table>

Inbuilt Fall discharge capacity by improving flow rates and thereby increasing the overall discharge capacity of the system. Inbuilt fall channels are 1800mm long.
1. Excavation
   a. Sufficient material should be excavated to accommodate channel units, concrete bedding and haunching.
   b. Any ‘soft spots’ or poorly compacted formation should be made good.

2. Setting Out
   a. Setting out pits should be accurately located to the correct line and level with a string line level with the top rear corner of the channel units.
   b. It may be advantageous to locate setting out points to the rear of the units to avoid having to lift the units over the string line.

3. Outfalls
   a. Birco Outfalls should be installed first.
   b. Sufficient material should be excavated to accommodate the trapped Birco Gulley.
   c. 150mm of ST4 mix (BS 8500-1&2) concrete of the appropriate mix is placed in the bottom of the excavation.
   d. The bottom section of the two part Birco Gulley is lowered into position, with the appropriate pipe adaptor placed the aperture for connection to the underground pipework.
   e. A suitable section of the wall of the outfall unit shall be cut out to allow adjacent drainage channels to abut without restricting the flow of water.
   f. Sufficient material should be excavated to accommodate channel units, to the dimensions indicated in the Birco Standard Detail Sheet.
   g. The top section of the two part Birco Gulley is lowered into position.
   h. The bedding concrete should be laid and brought up to the appropriate level dependent on surface finish as shown in the Birco Standard Detail Sheet.
   i. Channel Units shall be laid onto the freshly mixed bedding concrete, starting at the outfall, i.e. working uphill.
   j. Alternatively, the Channel Units may be bedded on to a layer of 10 to 40mm cement mortar (M2.5 mortar to BS EN 196-3) on a previously prepared concrete foundation.
   k. The concrete haunching shall be of a concrete grade appropriate to the Drainage Channel Loading Class as specified in the Birco Standard Detail Sheets.

4. Channel Installation
   a. Bedding concrete (ST1 to BS 8500-1&2) of the appropriate thickness and depth shall be laid as specified in the Birco Standard Detail Sheets.
   b. The top of the Birco Channel shall be 5mm below the final pavement surface.
   c. Channel Units shall be laid onto the freshly mixed bedding concrete, starting at the outfall, i.e. working uphill.
   d. Longitudinal movement joints shall also be formed between the hunching and the slabs as described in the Birco Drain Standard Detail Sheets.
   e. Where cutting the Birco Channel Units is required, they shall be cut with a concrete saw or disc cutter, so that no single Unit is less than 350mm long.
   f. Where cutting the Birco Channel Units is required, they shall be cut with a concrete saw or disc cutter, so that no single Unit is less than 350mm long. Birco gratings shall not be cut unless directed by the engineer. Any cut galvanised steel shall be renovated using Defcon Z, or similar approved.
   g. Haunching shall be carried out as one operation to a complete line of Channel Units, to the dimensions indicated in the Birco Standard Detail Sheets.
   h. The cleaning process should be repeated where necessary on completion of any remedial works.
   i. Marshalls’ M-Flex sealant should be gunned into the sealant groove.

5. Channel Joint Sealant
   a. Jointing of adjacent channels shall be carried prior to fixing the gratings. Marshalls M-Flex sealant shall be gunned into the sealant groove as described in the Birco Drain Standard Detail Sheets.
   b. Sufficient M-Flex sealant is gunned onto the top horizontal surface of the slab or haunching.
   c. Where cutting the Birco Channel Units is required, they shall be cut with a concrete saw or disc cutter, so that no single Unit is less than 350mm long. Marshalls M-Flex sealant should be gunned into the sealant groove.

6. Grating Installation
   a. Adjacent Carriageway and/or footway construction shall not be commenced within 3 days of any jointing or hunching surrounding concrete being placed.
   b. Birco gratings shall be securely bolted to Birco Channel Units, before adjacent pavement construction is commenced.
   c. All gratings shall be evenly spaced with both tightened down securely to the appropriate torque (Lite: 25Nm, 100, 150 and 200: 75 Nm, 300:100Nm).
   d. On completion of the works, the drainage channel units shall be cleaned out and left free from obstruction. This shall be carried out either by removal of gratings or by high pressure water jetting (100-150 bar at 200 litres/min minimum). Unless otherwise agreed with the specifier, the slot openings shall be covered by timber boards or other method during jetting operations.
   e. Outfall units shall be emptied.
   f. The cleaning process should be repeated where necessary on completion of any remedial works.

7. End Caps/End Cap Outlets
   a. Where the Birco Channel run does not terminate at an outfall, the base unit shall be sealed using the Birco End Cap or End Cap Outlet.
   b. These are to be held in position by installing 150mm of concrete haunching.
   c. Marshalls M-Flex sealant should be gunned into the sealant groove.

Traffic Drain is a medium capacity system that complements the Mini Beany range to provide continuity of flow between kerb and grate units. The robust concrete channel and strong cast iron grates are suitable to withstand fast moving vehicles and heavy loading highway applications. Traffic Drain is fully compatible with the full range of Mini Beany junctions, outfalls and other ancillary units.

Traffic Drain

In accordance with the Health and Safety at Work etc. Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work related upper limb disorders.

This may require the use of lifting aids to assist installation.

Scan the QR Code to watch the instalation video

Traffic Drain, Bedded
### Traffic Drain

#### A Top Unit

<table>
<thead>
<tr>
<th>Top Unit</th>
<th>Loading</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1500</td>
<td>300</td>
<td>214</td>
<td>110</td>
<td>22</td>
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</table>

#### B Constant Depth Channels

<table>
<thead>
<tr>
<th>Constant Depth Channels</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Insert Width (mm)</th>
<th>Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>210 Press Chan</td>
<td>1000</td>
<td>208</td>
<td>150</td>
<td>210</td>
<td>135</td>
<td>122</td>
</tr>
<tr>
<td>260 Press Chan</td>
<td>1000</td>
<td>208</td>
<td>150</td>
<td>260</td>
<td>185</td>
<td>110</td>
</tr>
<tr>
<td>310 Press Chan</td>
<td>1000</td>
<td>208</td>
<td>150</td>
<td>310</td>
<td>235</td>
<td>122</td>
</tr>
<tr>
<td>360 Press Chan</td>
<td>1000</td>
<td>208</td>
<td>150</td>
<td>360</td>
<td>285</td>
<td>144</td>
</tr>
<tr>
<td>210 Press Chan</td>
<td>500</td>
<td>208</td>
<td>150</td>
<td>210</td>
<td>135</td>
<td>61</td>
</tr>
<tr>
<td>260 Press Chan</td>
<td>500</td>
<td>208</td>
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<td>260</td>
<td>185</td>
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#### C Transition Channels

<table>
<thead>
<tr>
<th>Transition Channels</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Insert Width (mm)</th>
<th>Depth (mm)</th>
<th>Depth (mm) Upstream/Downstream</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>210 - 260 Press Chan</td>
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<td>208</td>
<td>150</td>
<td>210</td>
<td>260</td>
<td>135/185</td>
<td>54</td>
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<tr>
<td>260 - 310 Press Chan</td>
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<td>150</td>
<td>260</td>
<td>310</td>
<td>185/235</td>
<td>61</td>
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<tr>
<td>310 - 360 Press Chan</td>
<td>1000</td>
<td>208</td>
<td>150</td>
<td>310</td>
<td>360</td>
<td>235/285</td>
<td>77</td>
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#### D End Cap/Cap Outlets

<table>
<thead>
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<th>Unit Weight (kg)</th>
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<tbody>
<tr>
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<tr>
<td>260 End Cap</td>
<td>1</td>
<td>DR697310</td>
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<tr>
<td>310 End Cap</td>
<td>1</td>
<td>DR698310</td>
</tr>
<tr>
<td>360 End Cap</td>
<td>1</td>
<td>DR699310</td>
</tr>
<tr>
<td>210 Cap Outlet 2</td>
<td>2</td>
<td>DR696320</td>
</tr>
<tr>
<td>260 Cap Outlet 2</td>
<td>2</td>
<td>DR697320</td>
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<tr>
<td>310 Cap Outlet 2</td>
<td>2</td>
<td>DR698320</td>
</tr>
<tr>
<td>360 Cap Outlet 3</td>
<td>2</td>
<td>DR699320</td>
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</tbody>
</table>

#### E Outfalls & Access Covers

<table>
<thead>
<tr>
<th>Outfalls &amp; Access Covers</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Drain Cast Iron Access C&amp;F</td>
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</tr>
<tr>
<td>Inline Side Outfall</td>
<td>158</td>
<td>DR696080</td>
</tr>
<tr>
<td>Inline End Outfall</td>
<td>142</td>
<td>DR697070</td>
</tr>
<tr>
<td>Slit Box</td>
<td>72</td>
<td>DR698060</td>
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</table>

#### F Cover Plates

<table>
<thead>
<tr>
<th>Cover Plates</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover Plate 500 mm</td>
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<tr>
<td>Cover Plate 1000 mm</td>
<td>12</td>
<td>DR699010</td>
</tr>
<tr>
<td>Cover Plate 30/10</td>
<td>6</td>
<td>DR699030</td>
</tr>
</tbody>
</table>

Traffic Drain with reference numbers indicated in **bold** black are available ex-stock.
Traffic Drain with reference numbers indicated in light are manufactured to order.
Contact our sales office to discuss your requirements.

---

Mini Beany to Traffic Drain

Mini Beany can be used with Traffic Drain where the drainage run continues but the kerb line finishes. A smooth channel invert ensures undisturbed flow.
Traffic Drain Installation Guide

1. Excavation
   a. Sufficient material should be excavated to accommodate traffic drain Top and Base Units, concrete bedding and concrete haunch.
   b. Any 'soft spots' or poorly compacted formation should be made good.

2. Setting Out
   a. Setting out pins should be accurately located to the correct line and level with a string line level with the top front corners of the Base Units.
   b. It may be advantageous to locate setting out pins at the rear of the Units to avoid having to lift the Units over the string line.
   c. Sufficient setting out pins should be inserted where Traffic Drain base blocks* are laid on horizontal curves.

3. Outfalls
   a. Traffic Drain outfall* should be installed first.
   b. Sufficient material should be excavated to accommodate the required Traffic Drain outfall unit.
      i. Inline Outfall Unit
      ii. High Capacity Outfall
   c. 125mm of ST4 mix (BS 8500-1&2) concrete of the appropriate mix is placed in the bottom of the excavation.
   d. The bottom section of the required traffic drain outfall is lowered into position.
   e. Sufficient M-Flex sealant is gunned onto the top horizontal surface of the bottom section of the two part traffic drain outfall so as to provide a seal between the top and bottom sections.
   f. The top section of the two part traffic drain outfall is lowered into position.
   g. The bedding concrete should be laid and brought up flush to the top of the traffic drain outfall.
   h. The traffic drain Cast Iron Access Cover & Frame Unit is located on top of the top section of the outfall unit and should be set directly onto a liberal quantity of bitumen or cast iron mortar to completely fill the whole of the joint.
   i. Traffic Drain Access Covers and Frames are hinged and hand tooled to the direction of the traffic, specified ‘hearsay’ and ‘taffside’.

4. Base Unit
   a. When used in conjunction with the Veri Beany system, Traffic Drain base channels are the same as Veri Beany base channels.
   b. Base Units shall be laid onto the freshly mixed bedding concrete, starting at the outfall, i.e. working uphill.
   c. C25/30 concrete to BS 8500-1&2 and BS EN 206-1 for applications up to load classification D400 to BS EN 1433.
   d. A C25/30 mix concrete to BS 8500-1&2 and BS EN 206-1 for applications up to load classification P600 (BS EN 1433).
   e. Alternatively, the Base Units may be bedded on to a layer of 10to 40mm cement mortar 912 mortar to BS EN 998-2 or on a previously prepared conical foundation.

5. Channel Joint Sealant
   a. Sufficient M-Flex bituminous mastic jointing compound should be trickled on to one end of the Base Unit so that the joint will be well sealed when the next unit is tamped into position.
   b. Surplus sealant shall be removed from the inner surface of the units as work proceeds.

6. Traffic Drain Top Unit Installation
   a. The string line should be set to the level of the top corner of Units.
   b. Again, starting at the Outfall, the Units should be set directly onto a liberal quantity of bitumen or cast iron mortar to completely fill the whole of the joint.
   c. Traffic drain top units should be bed on the following materials.
      d. A Mortar class 12 cement mortar to BS EN 998-2 for bedding of the Cast Iron Top Units for applications up to load classification D400 to BS EN 1433.
      e. Marshall M Bond epoxy mortar for bedding of Cast Iron Top Units for applications E600 and F900 to BS EN 1433.
   f. The top units should be tamped into position close to previously laid Units and the alignment checked.
   g. The levels should be checked using the string line and a spirit level.
   h. In addition, the general alignment should be checked from all directions as each unit is laid. Any Unit deviating by more than 3mm in 3m from line and level shall be made good by lifting and relaying.
   i. Top units shall be laid with the top of the unit 5mm below the final pavement level.
   j. The inside and outside of the joints between Base and Top Units should be pointed and cleaned out with a brush or rag as work proceeds.
   k. It is not necessary for Top Block and Base Unit vertical joints to line up.
   l. When installed, the minimum depth of contraction above the top of the base unit to the drained area surface level shall not be less than 125mm.

7. Cover Plates
   a. Cover Plates, when used, should be bedded on cement mortar to the specified thickness, pointed inside and outside of the joints with the inside of the Base Units being cleaned out as work proceeds.
   b. The Cover Plates should be close jointed and the joints sealed with 50mm wide M Tape.
   c. Cover Plates shall be suitably protected before and during installation in order that the protective coating is not damaged.
   d. An ST4 mix concrete should be used for the bed and haunch of Base Units where cover plates are used.

8. End Caps
   a. Where the traffic drain run does not terminate at an outfall, the base unit shall be sealed using the Traffic Drain End Cap of required depth.
   b. The End Cap shall be securely placed against the vertical end of the base unit and haunched with fresh concrete (ST1 mix to BS 8500-1&2).

9. Pavement Installation
   a. Where Traffic Drain is laid on or adjacent to existing or proposed concrete slabs, transverse joints shall be formed within the units and haunched with fresh concrete (ST1 mix to BS 8500-1&2).

In accordance with the Health and Safety at Work etc Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work-related upper limb disorders.

This may require the use of lifting aids to assist installation.
Birco 200 Channels are available with inbuilt falls. Inbuilt Fall Channels increase drainage discharge capacity by improving flow rates and thereby increasing the overall discharge capacity of the system. Inbuilt fall channels are 1000mm long.

<table>
<thead>
<tr>
<th>Inbuilt Fall Channels</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
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<td>BF Channel No. 8</td>
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<td>BF Channel No. 9</td>
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Birco 200 Channels are available with reference numbers indicated in bold black are available ex-stock.
Birco 200 with reference numbers indicated in light grey are manufactured to order.
Contact our sales office to discuss your requirements.

<table>
<thead>
<tr>
<th>Inbuilt Fall</th>
<th>Loading</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
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<tbody>
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<td>528</td>
<td>100</td>
<td>53</td>
<td>12.5</td>
<td>DR475160</td>
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</table>
1. Excavation
   a. Sufficient material should be excavated to accommodate channel units, and
      any "soft spots" or poorly compacted formation should be made good.

2. Setting Out
   a. Setting out points should be accurately located to the correct line and level
      and with a string line level with the top rear corners of the channel units.
   b. It may be advantageous to locate setting out pins at the rear of the units to
      avoid having to lift the units over the string line.

3. Outfalls
   a. Birco Outfalls should be installed first.
   b. Sufficient material should be excavated to accommodate the
      trapped Birco Gulley.
   c. 150mm of ST4 mix (BS 8500-1&2) concrete of the appropriate mix is
      placed in the bottom of the excavation.
   d. The bottom section of the two-part Birco Gulley is lowered into position,
      with the appropriate pipe adaptor placed the aperture for connection to
      the underground pipework.
   e. A suitable section of the wall of the outfall unit shall be cut out to allow
      adjacent drainage channels to abut without restricting the flow of water.
      Cutting shall be achieved by using a concrete saw or disc cutter.
   f. Sufficient M-Flex sealant is gunked onto the top horizontal surface of the
      bottom section of the two-part Birco Gulley so as to provide a seal between
      the top and bottom sections.
   g. The top section of the two-part Birco Gulley is lowered into position
   h. The bedding concrete should be laid and brought up to
      the appropriate level dependant on surface finish as shown in the
      Birco Standard Detail Sheet.

4. Channel Installation
   a. Bedding concrete (C15 to BS 8500-1&2) of the appropriate thickness and
      depth shall be laid as specified in the Birco Standard Detail Sheets.
   b. The top of the Birco Channel shall be 5mm below the
      final pavement surface.
   c. Channel Units shall be laid onto the freshly mixed bedding concrete,
      starting at the outfall, i.e. working uphill
   d. Alternately, the Channel Units may be bedded on to a layer of 10 to
      40mm cement mortar (M12 mortar to BS EN 196-2) on a previously
      prepared concrete foundation.
   e. The concrete haunching shall be of a concrete grade
      appropriate to the Drainage Channel Loading Class as specified
      in the Birco Standard Detail Sheets.
   f. Haunching shall be carried out as one operation to a complete line of
      Channel Units, to the dimensions indicated in the Birco Standard Detail
   g. Where channels are laid on or adjacent to existing or proposed
      concrete slabs, transverse joints shall be formed within the Units and
      haunching adjacent to the slab joints.
   h. Longitudinal movement joints shall also be formed
      between the haunching and the slabs as described in the
      Birco Drain Standard Detail Sheets.
   i. Where cutting the Birco Channel Units is required, they shall be cut with
      a concrete saw or disc cutter, so that no single Unit is less than 350mm long.
      Birco gratings shall not be cut by the engineer. Any cut
      galvanised steel shall be renovated using Defcon Z, or similar approved.

5. Channel Joint Sealant
   a. Jointing of adjacent channels shall be carried prior to fixing the gratings.
      Marshal M-Flex sealant shall be gunned into the sealant groove
      when jointing adjacent channels.
   b. Surplus sealant shall be removed from the inner surface of the
      units as work proceeds.

6. Grating Installation
   a. Adjacent Carriageway and/or footway construction shall not be
      commenced within 5 days of any jointing or haunching/surrounding
      concrete being placed.
   b. Birco gratings shall be securely bolted to Birco Channel Units, before
      adjacent pavement construction is commenced.
   c. All gratings shall be evenly spaced with bolts tightened down securely
      to the appropriate torque (100-250Nm, 150 and 200-75Nm, 150-100Nm).
   d. On completion of the works, the drainage channel units shall be
      cleaned out and left free from obstruction. This shall be carried out
      either by removal of gratings or by high pressure water jetting (100-150
      bar at 200 litres/mn minimum). Unless otherwise agreed with the specifier,
      the slot openings shall be covered by timber boards or other method
      during jetting operations.
   e. Outfall units shall be emptied.
   f. The cleaning process should be repeated where necessary on completion
      of any remedial works.

7. End Caps/End Cap Outlets
   a. Where the Birco Channel run does not terminate at an outfall, the base unit
      shall be sealed using the Birco End Cap or End Cap Outlet.
   b. These are to be held in position by installing 150mm of concrete haunching.
   c. Marshalls M-Flex sealant shall be gunked into the sealant groove.

In accordance with the Health and Safety at Work etc. Act 1974, the
Manual Handling Operations Regulations 1992 (as amended 2004) and the
Construction (Design and Management) Regulations 2015, risk assessments
should be carried out to protect workers from risks associated with
musculoskeletal disorders and work related upper limb disorders.
This may require the use of lifting aids to assist installation.

Scan the QR Code to watch the installtion video

Max-E Channel
Grid Drainage System

Max-E Channel is a high capacity system that complements
the Beany range to ensure continuity between kerb and top
units. The range of different concrete top units offered in a
variety of colours and finishes complements any aesthetic.
A cast iron top option completes the range and provides a
solution for the highest loading classification. Max-E Channel is
fully compatible with the full range of Beany junctions, outfalls
and other ancillary units.
Max-E Channel

A. Top Units

<table>
<thead>
<tr>
<th>Top Units</th>
<th>Loading</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast Iron Grate F900</td>
<td>E</td>
<td>500</td>
<td>400</td>
<td>165</td>
<td>62</td>
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</tr>
<tr>
<td>Standard Grey Reinforced Concrete Top</td>
<td>E</td>
<td>500</td>
<td>400</td>
<td>170</td>
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<td>DR975810</td>
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<tr>
<td>Conservation Reinforced Top</td>
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<td>500</td>
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B. Constant Depth Channels

<table>
<thead>
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<th>Constant Depth Channels</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Insert Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
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<td>400</td>
<td>280</td>
<td>295</td>
<td>205</td>
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<td>Channel 295</td>
<td>580</td>
<td>400</td>
<td>280</td>
<td>295</td>
<td>205</td>
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<tr>
<td>Channel 365</td>
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<td>400</td>
<td>280/360</td>
<td>295</td>
<td>205/275</td>
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C. Transition Channels

<table>
<thead>
<tr>
<th>Transition Channels</th>
<th>Length (mm)</th>
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<th>Depth (mm)</th>
<th>Insert Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
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<td>205</td>
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<td>280</td>
<td>295</td>
<td>205</td>
<td>87</td>
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</table>

D. End Caps

<table>
<thead>
<tr>
<th>End Caps</th>
<th>Unit Weight (kg)</th>
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<td>Base End Cap</td>
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<tr>
<td>Base End Cap</td>
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</table>

E. Gully Outfall & Access Covers

<table>
<thead>
<tr>
<th>Gully Outfall &amp; Access Covers</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gully Outfall 150</td>
<td>277</td>
<td>DR840010</td>
</tr>
</tbody>
</table>

Beany Block to Max-E Channel

Beany can be used with Max-E Channel where the drainage run continues but the kerb line finishes.
A smooth channel invert ensures undisturbed flow.

Cover Plates

<table>
<thead>
<tr>
<th>Cover Plates</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
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<tbody>
<tr>
<td>Cover Plate Standard 17</td>
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<td>DR919025</td>
</tr>
<tr>
<td>Cover Plate Cut 50/110</td>
<td>96</td>
<td>DR919040</td>
</tr>
</tbody>
</table>

Max-E Channel with reference numbers indicated in bold black are available ex-stock. Max-E Channel with reference numbers indicated in light are manufactured to order. Contact our sales office to discuss your requirements.
Max-E Channel Installation Guide

1. Excavation
   a. Sufficient material should be excavated to accommodate Top and Base Units, concrete bedding and haunching.
   b. Any ‘soft spots’ or poorly compacted formation should be made good.

2. Setting Out
   a. Setting out pins should be accurately located to the correct line and level with a string line level with the top front corners of the Base Units.
   b. It may be advantageous to locate setting out pins to the rear of the Units, to avoid having to lift the Units over the string line.
   c. Sufficient setting out pins should be inserted where Max-E Channel Bases are laid on horizontal curves.

3. Outfalls
   a. Max-E Channel Outfalls should be installed first.
   b. Sufficient material should be excavated to accommodate the trapped Max-E Channel Gulley.
   c. 125mm of concrete of the appropriate mix is placed in the bottom of the excavation.
   d. The bottom section of the two part Max-E Channel Gulley is lowered into position.
   e. Sufficient M-Flex sealant is gunned onto the top horizontal surface to provide a seal between the top and bottom sections of the bottom section of the two part Max-E Channel Gulley so as to provide a seal between the top and bottom sections.
   f. The top section of the two part Max-E Channel Gulley is lowered into position.
   g. The bedding concrete should be laid and brought up flush to the top of the Max-E Channel Gulley.
   h. The Max-E Channel Base Outfall Block should be set directly onto a liberal quantity of stiff, cement mortar.
   i. The Cast iron Access Cover & Frame Units should be set directly atop the Max-E Channel Base Outfall Block, ensuring that the top of the Max-E Channel Gulley is lowered into position.
   j. The bedding concrete should be laid and brought up flush to the top of the Max-E Channel Gulley.
   k. The top section of the two part Max-E Channel Gulley is lowered into position.

4. Base Unit Installation
   a. Bedding concrete of the appropriate mix and to the appropriate thickness and depth shall be laid.
   b. Base Units shall be laid onto the freshly mixed bedding concrete, starting at the outfall, i.e. working uphill.
   c. Alternatively, the Base Units may be bedded on to a layer of 10 to 40mm cement mortar on a previously prepared concrete foundation.
   d. Where cutting is necessary, one or two Units shall be cut so that no single Unit is less than 200mm in length.
   e. All cutting and trimming of the Units shall be carried out with a concrete saw or disc cutter.

5. Channel Joint Sealant
   a. Sufficient M-Seal bituminous mastic jointing compound should be trowelled on to one end face of the Base Unit so that the joint will be well sealed when the next Unit is tamped into position.
   b. Surplus sealant shall be removed from the inner surface of the Units as work proceeds.

6. Top Block Installation
   a. The string line should be set to the level of the top corner of Units.
   b. Again, starting at the Outfall, the Units should be set directly onto a liberal quantity of stiff, cement mortar to completely fill the whole of the joint.
   c. Cement mortar shall be class M12 in accordance with BS EN 998-2 for applications up to and including D400 and should be M Bond epoxy mortar for higher loading applications.
   d. The M Bond epoxy mortar should be mixed in accordance with the instructions on the container.
   e. The Top Units should be tamped into position close to previously laid Units, and the alignment checked.
   f. The levels should be checked using the string line and a spirit level.
   g. In addition, the general alignment should be checked from all directions as each Unit is laid. Any Unit deviating by more than 3mm in 3m from line and level shall be made good by lifting and relaying.
   h. The inside and outside of the joints between Base and Top Units should be pointed and cleaned out with a brush or razor as work proceeds.
   i. Where cutting is necessary, one or two Units shall be cut so that no single Unit is less than 200mm in length. All cutting and trimming of the Units shall be carried out with a concrete saw or disc cutter.
   j. It is not necessary for Top and Base Unit vertical joints to line up.
   k. The front and rear concrete haunching is installed to the dimensions shown on the standard detail or drawing.

7. End Caps
   a. Where the Max-E Channel run does not terminate at an outfall, the base unit shall be sealed using the Max-E-Channel End Cap.
   b. The End Cap shall be securely placed against the vertical end of the base unit and haunched with fresh concrete.

8. Pavement Installation
   a. Where Max-E Channel is laid on, or adjacent, to existing or proposed concrete slabs, transverse joints shall be formed within the units and haunching adjacent to the slab joints. Longitudinal movement joints between the Max-E Channel haunching and the slabs should also be formed.
   b. Where necessary, the Top Unit drainage openings shall be protected against the ingress of material during concreteing operations by covering with Waterproof Cloth Tape.

In accordance with the Health and Safety at Work etc. Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work related upper limb disorders. This may require the use of lifting aids to assist installation.

Scan the QR Code to watch the installation video.
### Constant Depth Channel

<table>
<thead>
<tr>
<th>Constant Depth Channel</th>
<th>Loading</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Insert Width (mm)</th>
<th>Depth (mm)</th>
<th>Insert Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>In-situ Top</th>
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<tbody>
<tr>
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Drexus XL with reference numbers indicated in **bold** black are available ex-stock.

Drexus XL with reference numbers indicated in light are manufactured to order.

Contact our sales office to discuss your requirements.

### Transition Channels

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<thead>
<tr>
<th>Transition Channels</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Insert Width (mm)</th>
<th>Depth (mm)</th>
<th>Insert Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>In-situ Top</th>
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<tr>
<td>425-525 M to M</td>
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### End Cap/Cap Outlets

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<tr>
<td>625 End Cap</td>
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Drexus XL Installation Guide

1. Excavation & Setting Out
   a. Mark out the required line of drainage.
   b. Mark out the required level for the system.
   c. Excavate trench with an additional depth and width of 150mm (C250/D400) or 200mm (F900) either side that the respective dimensions of the selected Chamber and Lid. For channel depths, see the Marshalls drainage design guide. Suitable trench support and edge protection should be used if identified by the site risk assessment.

2. Access and Outfall Chamber installation
   a. Excavate to formation level.
   b. Install trench support and excavation access as required.
   c. Prepare formation by trimming or laying binding concrete.
   d. Position chamber or lid brunt unit in excavation.
   e. Set chamber to correct level and orientation using non-compressible setting block.
   f. Install formwork and supports for the concrete surround.
   g. Provide temporary support to the unit as required to maintain position during placement of base concrete.
   h. Place concrete around chamber unit to form base and part of the vertical surround. The surround should extend no more than 75 mm up the side of the chamber unit.
   i. Check level and orientation, adjust as required.
   j. After initial set has been achieved, install additional chamber units and connection pipework in position as required.
   k. Extend formwork and place concrete generally as items 6, 7, 8 & 9 to the top surface of the chamber.
   l. When the concrete has achieved strength, strike formwork and remove.
   m. Backfill chamber to the underside of the final pavement construction or as required.
   n. Bed and haunch cover and frame using a minimum mortar Class 12 to BS EN 998-2 or a similar proprietary bedding compound suitable for application and loading. Level and adjust as required.

3. Drexus XL Unit Installation
   a. Line the trench bottom with a 150mm (C250/D400) or 200mm (F900) deep layer of semi-dry concrete to provide a bed for the Channel.
   b. Manually lift the channel into position if safe to do so. The channel can be lifted by straps if manual handling is unsuitable. Seek further guidance on lifting equipment from the relevant supplier.
   c. If necessary pin the feet into position by placing a suitable pin (e.g. setting out pin) into the V notch of the channel feet. The channel can also be braced to the walls of the trench; this will help avoid movement of the system during the concrete pour.
   d. Pour the concrete evenly each side of the channel until the concrete has had time to fully cure.
   e. Ensure a bung is placed into each of the inlet slots to prevent concrete ingress.
   f. Continue to pour concrete to surface level with the top of the rubber bungs.
   g. Finish the concrete surface with power float type devices which will move over the rubber bungs.
   h. When the concrete has set the inlet bungs can be removed, this is best achieved by piecing the units and leveling along the inlet.
   i. If necessary pin the feet into position by placing a suitable pin (e.g. setting out pin) into the V notch of the channel feet. The channel can also be braced to the walls of the trench; this will help avoid movement of the system during the concrete pour.
   j. Pour the concrete evenly each side of the channel until the concrete has had time to fully cure.

4. End Cap and End Cap Outlet
   a. The channel should be terminated with either an end cap or end cap outlet. The end cap is universal for both male and female ends of the channel whereas the end cap outlet is specific.
   b. When terminating the run at an access chamber/outfall an access chamber connector should be used to enter the chamber it can be trimmed to suit. The end cap outlet has also been designed to transition to standard drainage twin wall pipe by way of a standard coupling.

5. Surface Installation
   a. Prior to the next pour of concrete reinforcement bars should be installed if required by the pavement design. Engineering advice should be sought for specific guidance.
   b. Ensure a bung is placed into each of the inlet slots to prevent concrete ingress.
   c. Continue to pour concrete to surface level with the top of the rubber bungs.
   d. Finish the concrete surface with power float type devices which will move over the rubber bungs.
   e. When the concrete has set the inlet bungs can be removed, this is best achieved by piecing the units and leveling along the inlet.
   f. After concreting the system should not be loaded with passing traffic until the concrete has had time to fully cure.

In accordance with the Health and Safety at Work etc Act 1974, the Manual Handling Operation Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work related upper limb disorders. This may require the use of lifting aids to assist installation.
An innovative, concrete single piece combined kerb and drainage solution. Mono Beany is a low to medium capacity system which combines strength and aesthetics through Marshalls' high strength M-Tech concrete. A recycled inner plastic core provides hydraulic flow benefits at low capacities. Available in two depths and in both Half Battered and 45˚Splayed profiles with a range of accessories to provide a comprehensive drainage system which carries the BSI Kitemark.
Mono Beany

A Constant Depth Channels

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D Outfalls & Accessories

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F Road Crossing Accessories

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Mono Beany with reference numbers indicated in bold. Black are available ex stock. Mono Beany with reference numbers indicated in light are manufactured to order. Contact our sales office to discuss your requirements.
Mono Beany Installation Guide

1. Excavation
   a. Sufficient material should be excavated to accommodate the units, concrete bedding and haunching.
   b. Any ‘soft spots’ or poorly compacted formation should be made good.

2. Setting Out
   a. Setting out pins should be accurately located to the correct line and level with a string line level placed to the rear of the kerb.
   b. Sufficient setting out pins should be inserted where Mono Beany units are laid on horizontal curves.

3. Outfalls
   a. Mono Beany Outfall(s) should be installed first.
   b. Sufficient material should be excavated to accommodate the Trapped Mono Beany Gulley.
   c. 125mm of ST4 mix (BS 8500-1&2) concrete of the appropriate mix is placed in the bottom of the excavation.
   d. The bottom section of the two part Mono Beany Outfall is lowered into position.
   e. Sufficient M-Flex sealant is gunned onto the top horizontal surface of the bottom section of the two part Mono Beany Outfall so as to provide a seal between the top and bottom sections.
   f. The bedding concrete should be laid and brought up flush to the top of the Mono Beany Outfall.
   g. The cast iron Access Cover & Frame Units should be set directly onto a liberal quantity of off, cement mortar to completely fill the whole of the joint.

4. Mono Beany Unit Installation
   a. Bedding concrete (ST1 to BS 8500-1&2 of the appropriate thickness and depth) shall be laid.
   b. Mono Beany Units shall be laid onto the freshly mixed bedding concrete, starting at the outfall, i.e. working uphill.
   c. Alternatively, the Mono Beany Units may be bedded on to a layer of 10 to 40mm cement mortar (M2 mortar to BS 5196-2) on a previously prepared concrete foundation.
   d. Where cutting is necessary, one or two units shall be cut so that no single unit is less than 200mm in length and no cuts shall be within 50mm of the inlet aperture. No cutting shall impair the stability of the Unit.
   e. All cutting and trimming of the Units shall be carried out with an appropriate cutting tool.

5. Mono Beany Joint Sealant
   a. Sufficient Marshall M-Flex sealant should be gunned into the sealant groove at either end of the unit.

6. Mono Beany End Cap
   a. Where the Mono Beany run does not terminate at an outfall, the base unit shall be sealed using the Mono Beany End Cap.
   b. The End Cap shall be securely placed against the vertical end of the base unit and haunched with fresh concrete (ST1 mix to BS 8500-1&2).

7. Pavement Installation
   a. Where Mono Beany is laid on or adjacent to existing or proposed concrete slabs, transverse joints shall be formed within the units and haunching adjacent to the slab joints and also longitudinal movement joints between the haunching and the slabs.
   b. Where necessary, the Unit drainage openings shall be protected against the ingress of material during concreting operations by covering with Waterproof Cloth Tape.

In accordance with the Health and Safety at Work etc. Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work related upper limb disorders. This may require the use of lifting aids to assist installation.

Scan the QR code to watch the installation video.

Case Study - M1

Marshalls supplied 15,000 linear metres of Mono Beany one-piece combined kerb and drainage to the new M1 smart motorway scheme.

Challenge

The road network is a crucial part of our national transport system and Sulzer to improve these networks incurs cost, hinders employment opportunities and makes it harder to do business.

Construction is already a serious problem on the M1 between junctions 28 and 31 which carries around 95,000 vehicles per day.

The challenge was to install new infrastructure, including drainage attenuation, with minimal disruption and to select a suitable product engineered to help contractors meet deadlines. This would ensure the M1 was open and running at full capacity within the project time scales. The client also needed to keep within budget and didn’t want to pay for a costly over-engineered system.

Solution

Marshalls was chosen to supply linear drainage to the project. Mono Beany is Marshalls’ first one-piece combined kerb and drainage system made with ultra-tough M-Tech concrete which has been proven to significantly reduce installation time.

This innovative product is available in two depths which both have a recycled inner plastic core to provide hydraulic flow benefits at low and medium capacities. Each one metre unit can carry up to 40 tonnes (Class D400) when trafficked. The inlet apertures are divergent and angled at 45° to prevent blockages and maximise drainage efficiency. These features ensure surface water is cleared rapidly and internal flow is smooth and efficient.

The hydraulic capacity requirements varied along the run and therefore a mix of Mono Beany 321 and 502 units were required as this was deemed more cost-effective. Marshalls also used its expertise to develop a new transition unit to complete the M1 scheme as part of the Highways Agency’s focus on innovation. This was developed in order to create a smooth hydraulic transition from a 502 to a 321 Mono Beany unit, which reduced the hydraulic capacity, while coming within budget.

Client:
Highways England

Contractor:
Costain

Engineer:
Mouchel (Manchester)
Mini Beany®
Combined Kerb and Drainage System

Mini Beany is a low to medium capacity combined kerb and drainage system which evolved from the successful Beany range. The robust concrete construction makes this the ideal choice for areas of heavy or abnormally heavy wheel loads. Available in a choice of top finishes to complement a wide range of projects, from urban to rural.

Benefit
Costain initially anticipated it would lay 240 metres of Mono Beany per day; however, using the revolutionary, easy-to-install Mono Beany system the installation time was considerably reduced, with 340 metres installed per day to the scheme.

Malcolm Bell, Construction Manager from Costain said: “Due to how quickly we were able to install the innovative Mono Beany system there was an increased demand on deliveries to site. Marshalls offered a reliable and guaranteed supply throughout the project, delivering three to four loads per week direct to site, often delivering two loads per day. This helped to ensure we met our completion deadlines and kept works disruption to a minimum.

“Working with Marshalls also offered Costain a dedicated and knowledgeable design team to meet our requirements for this scheme. “These are all important factors when tasked with installing over nine miles of drainage to a major strategic route connecting people, communities and businesses.”

In the longer term this scheme will help relieve congestion and smooth traffic flow along this stretch of the M1, improving safety and journey times for commuters. These benefits will also support economic development in the region.

Responding to the recent announcement by Highways England that there will be a £1.5bn investment in smart motorway schemes David Jackson, Trading Drainage Director at Marshalls said: “Marshalls is already engaged in a number of smart motorway schemes as part of this investment, offering design expertise on a wide range of suitable products.

“At the UK’s leading supplier of hard landscaping materials, we are committed to developing effective water management and linear drainage solutions to meet the needs of contractors.

“Having already supplied junctions 28-31 of the M1, we are poised for further involvement to improve the road network and have the capacity and capability to deal with further orders.”
### Mini Beany

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<td>Cover Plate 500 mm</td>
<td>12</td>
<td>DR695050</td>
</tr>
<tr>
<td>Cover Plate 1000 mm</td>
<td>6</td>
<td>DR695060</td>
</tr>
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#### Cable Duct Blocks

<table>
<thead>
<tr>
<th>Cable Duct Block Type</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Duct Block 3</td>
<td>15</td>
<td>DR694040</td>
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#### Access Covers

<table>
<thead>
<tr>
<th>Access Cover Type</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
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<tbody>
<tr>
<td>45.5 Off Side Access Cover</td>
<td>48</td>
<td>DR694020</td>
</tr>
<tr>
<td>45.5 Side Access Cover</td>
<td>48</td>
<td>DR694030</td>
</tr>
</tbody>
</table>

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*Special finishes may be available upon request.*
Mini Beany Installation Guide

1. Excavation
   a. Sufficient material should be excavated to accommodate Top and Base Units, concrete bedding and rear concrete haunch.
   b. Any ‘soft spots’ or poorly compacted formation should be made good.

2. Setting Out
   a. Setting out pins should be accurately located to the correct line and level with a string line level with the top front corners of the Base Units.
   b. It may be advantageous to locate setting out pins to the rear of the Units to avoid having to lift the Units over the string line.
   c. Sufficient setting out pins should be inserted where Mini Beany Blocks are laid on horizontal curves.

3. Outfalls
   a. Mini Beany Outfalls should be installed first.
   b. Sufficient material should be excavated to accommodate the required Mini Beany outfall unit.
      i. Inline Side Outfall Unit
      ii. Inline End Outfall Unit
      iii. High-Capacity Outfall
   c. 125mm of 1:3 mix (BS 8500-162) concrete of the appropriate mix is placed in the bottom of the excavation.
   d. The bottom section of the required Mini Beany gulley is lowered into position.
   e. Sufficient M-Flex sealant is gunned onto the top horizontal surface of the bottom section of the two part Mini Beany Gulley so as to provide a seal between the top and bottom sections.
   f. The top section of the two part Mini Beany Gulley is lowered into position.
   g. The bedding concrete should be laid and brought up flush to the top of the Mini Beany Gulley.
   h. The Mini Beany Cast Iron Access Cover & Frame Units located on top of the Outfall Unit should be set directly onto a liberal quantity of stiff, cement mortar to completely fill the whole of the joint.
   i. The Mini Beany Access Covers and Frames are hinged and handed to the direction of the traffic, specified ‘nearside’ and ‘offside’.
   j. The rear concrete haunching is installed to within 50mm of the top of the Top Block.

4. Base Unit Installation
   a. Building concrete (C11 to BS 8500-162) of the appropriate thickness and depth shall be laid.
   b. Base Units shall be laid onto the freshly mixed bedding concrete, starting at the outfall, i.e. working uphill.
   c. Alternatively, the Base Units may be bedded on to a layer of 100-40mm thick, cement mortar (M12 mortar to BS EN 998-2) on a previously prepared foundation.
   d. Where cutting is necessary, one or two Units shall be cut so that no single Unit is less than 200mm in length and no cuts shall be within 50mm of the inlet aperture. No cutting shall impair the stability of the Unit.
   e. All cutting and trimming of the Units shall be carried out with a concrete saw or disc cutter.

5. Channel Joint Sealant
   a. Sufficient M-Seal bituminous mastic jointing compound should be trowelled on to one end face of the Base Unit so that the joint will be well sealed when the next Unit is tamped into position.
   b. Surplus sealant shall be removed from the inner surface of the Units as work proceeds.

6. Top Block Installation
   a. The string line should be set to the level of the top corner of Units.
   b. Again, starting at the Outfall, the Units should be set directly onto a liberal quantity of stiff, cement mortar to completely fill the whole of the joint.
   c. Cement mortar shall be Class M12 in accordance with BS EN 998-2.
   d. The Top Blocks should be tamped into position close to previously laid Units and the alignment checked.
   e. The levels should be checked using the string line and a spirit level.
   f. In addition, the general alignment should be checked from all directions as each Block is laid. Any Unit that is out of line by more than 3mm in 3m from line and level shall be made good by lifting and relaying.
   g. The inside and outside of the joints between Base and Top Units should be pointed and cleaned out with a brush or rag as work proceeds.
   h. Where cutting is necessary, one or two Units shall be cut so that no single Unit is less than 200mm in length. All cutting and trimming of the Units shall be carried out with a concrete saw or disc cutter.
   i. It is not necessary for Top Block and Base Unit vertical joints to line up.
   j. The rear concrete haunching is installed to within 50mm of the top of the Top Block.

In accordance with the Health and Safety at Work etc. Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work related upper limb disorders. This may require the use of lifting aids to assist installation.

Scan the QR Code to watch the installation video.

The original and the largest capacity combined kerb and drainage system on the market. Trusted and proven over more than 30 years with over 1 million linear meters installed and working. A two piece concrete system available in either standard or textured finishes combines the largest hydraulic capacity with the strongest loading classification. Supported by a range of accessories to deliver a flexible, versatile and aesthetically appealing solution for a variety of projects.
Beany Block

A. Top Blocks

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Height (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>205 Base Str</td>
<td>430</td>
<td>280</td>
<td>205</td>
<td>DR800020</td>
</tr>
<tr>
<td>295 Base Str</td>
<td>430</td>
<td>280</td>
<td>295</td>
<td>DR800020</td>
</tr>
<tr>
<td>365 Base Str</td>
<td>440</td>
<td>280</td>
<td>365</td>
<td>DR800020</td>
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</table>

B. Radial Tops

<table>
<thead>
<tr>
<th>Top Caps</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HB 50/11m</td>
<td>71</td>
<td>DR730020</td>
</tr>
<tr>
<td>HB 19/11m</td>
<td>71</td>
<td>DR730030</td>
</tr>
<tr>
<td>HB 10/8m Cut</td>
<td>71</td>
<td>DR730040</td>
</tr>
<tr>
<td>HB 7/6m Cut</td>
<td>71</td>
<td>DR730050</td>
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</tbody>
</table>

C. Constant Depth Channels

<table>
<thead>
<tr>
<th>Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/20m</td>
<td>77</td>
<td>DR720040</td>
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<tr>
<td>19/11m</td>
<td>77</td>
<td>DR720050</td>
</tr>
<tr>
<td>10/8m Cut</td>
<td>71</td>
<td>DR720060</td>
</tr>
<tr>
<td>7/6m Cut</td>
<td>71</td>
<td>DR720070</td>
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</table>

D. Radial Channels

<table>
<thead>
<tr>
<th>Radial Duct Block</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HB 10/8m Cut</td>
<td>85</td>
<td>DR720040</td>
</tr>
<tr>
<td>HB 7/6m Cut</td>
<td>85</td>
<td>DR720050</td>
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</table>

E. Transition Channels

<table>
<thead>
<tr>
<th>Transitions</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Invert (mm)</th>
<th>Depth (mm)</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>205 - 295</td>
<td>280</td>
<td>205</td>
<td>205</td>
<td>205</td>
<td>60</td>
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<tr>
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<td>205</td>
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<td>275</td>
<td>85</td>
<td>DR720020</td>
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F. End Caps

<table>
<thead>
<tr>
<th>End Caps</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HB 50/11m</td>
<td>87</td>
<td>DR850020</td>
</tr>
<tr>
<td>HB 19/11m</td>
<td>87</td>
<td>DR850030</td>
</tr>
<tr>
<td>HB 10/8m Cut</td>
<td>87</td>
<td>DR850040</td>
</tr>
<tr>
<td>HB 7/6m Cut</td>
<td>87</td>
<td>DR850050</td>
</tr>
</tbody>
</table>

G. Outfalls & Access Covers

<table>
<thead>
<tr>
<th>Outfalls &amp; Access Covers</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HB 50/11m Outfall</td>
<td>87</td>
<td>DR850020</td>
</tr>
<tr>
<td>HB 19/11m Outfall</td>
<td>87</td>
<td>DR850030</td>
</tr>
</tbody>
</table>

H. Cable Duct Blocks

<table>
<thead>
<tr>
<th>Cable Duct Block</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HB 50/11m</td>
<td>87</td>
<td>DR720050</td>
</tr>
<tr>
<td>HB 19/11m</td>
<td>87</td>
<td>DR720050</td>
</tr>
</tbody>
</table>

I. Standard Kerb Transitions

<table>
<thead>
<tr>
<th>Standard Kerb Transitions</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop End Top Block L/H</td>
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<td>DR700010</td>
</tr>
<tr>
<td>Stop End Top Block R/H</td>
<td>87</td>
<td>DR700011</td>
</tr>
</tbody>
</table>

J. Cover Plates

<table>
<thead>
<tr>
<th>Cover Plates</th>
<th>Unit Weight (kg)</th>
<th>Item Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover Plate</td>
<td>87</td>
<td>DR700010</td>
</tr>
</tbody>
</table>

Beany Block with reference numbers indicated in bold are available ex-stock. Beany Block with reference numbers in light are manufactured to order. Contact our sales office to discuss your requirements.

A special finish may be available upon request including bus stop units.

* Special finishes may be available upon request including bus stop units.

* Radius cover plates available upon request.
Beany Block Installation Guide

1. Excavation
   a. Sufficient material should be excavated to accommodate top and base units, concrete bedding and haunching.
   b. Any ‘soft spots’ or poorly compacted formation should be made good.

2. Setting Out
   a. Setting out pins should be accurately located to the correct line and level with a string line level with the top front corners of the Base Units.
   b. It may be advantageous to locate setting out pins to the rear of the units to avoid having to lift the units over the string line.
   c. Sufficient setting out pins should be inserted where Beany Blocks are laid on horizontal curves.

3. Outfalls
   a. Beany Outfalls should be installed first.
   b. Sufficient material should be excavated to accommodate the Trapped Beany Gulley.
   c. 125mm of ST4 (BS 8500-1&2) concrete of the appropriate mix is placed in the bottom of the excavation.
   d. The bottom section of the two part Beany Gulley is lowered into position.
   e. Sufficient M-Flex sealant is gunned onto the top horizontal surface of the bottom section of the two part Beany Gulley so as to provide a seal between the top and bottom sections.
   f. The top section of the two part Beany Gulley is lowered into position.
   g. The bedding concrete should be laid and brought up flush to the top Beany Gulley.
   h. The Beany Base Outfall Block should be set directly onto a liberal quantity of stiff, cement mortar to completely fill the whole of the joint.
   i. The top block installation guide should be carried out with a concrete saw or disc cutter.
   j. The rear concrete haunching is installed to within 50mm of the top of the top block.

4. Base Unit Installation
   a. Bedding concrete (ST1 to BS 8500-1&2) of the appropriate thickness and depth shall be laid.
   b. Base units shall be bedded onto the freshly mixed bedding concrete, starting at the outfall, i.e. working uphill.
   c. Alternatively, the base units may be bedded on to a layer of 10 to 40mm cement mortar (M12 mortar to BS 8500-998-2) on a previously prepared concrete foundation.
   d. Where cutting is necessary, one or two units shall be cut so that no single unit is less than 200mm in length and no cuts shall be within 50mm of the rear aperture. No cutting shall impair the stability of the unit.
   e. All cutting and trimming of the units shall be carried out with a concrete saw or disc cutter.
   f. In addition, the general alignment should be checked from all directions as each block is laid. Any unit deviating by more than 3mm from line and level shall be made good by lifting and relaying.
   g. The inside and outside of the joints between base and top units should be pointed and cleaned out with a brush or rag as work proceeds.
   h. Where cutting is necessary, one or two units shall be cut so that no single unit is less than 200mm in length. All cutting and trimming of the units shall be carried out with a concrete saw or disc cutter.
   i. It is not necessary for top block and base unit vertical joints to line up.
   j. Setting out pins should be accurately located to the correct line and level with the top front corners of the Base Units.

5. Channel Joint Sealant
   a. Sufficient M-Flex bituminous mastic jointing compound should be applied to one and face of the base unit so that the joint will be well sealed when the next unit is tamped into position.
   b. Surplus sealant shall be removed from the inner surface of the unit as work proceeds.

6. Top Block Installation
   a. The string line should be set to the level of the top corner of units.
   b. Again, starting at the Outfall, the units should be bedded on to a liberal quantity of stiff, cement mortar to completely fill the whole of the joint.
   c. Cement mortar shall be Class M12 in accordance with BS 8500-998-2.
   d. The top blocks should be tamped into position close to previously laid units and the alignment checked.
   e. The levels should be checked using the string line and spirit level.

7. Cover Plates
   a. Cover plates, when used, should be bedded on cement mortar to the specified thickness, pointed inside and outside of the joints with the inside of the base units being cleaned out as work proceeds.
   b. The Cover plates should be close jointed and the joints sealed with 50mm wide M Tape.
   c. Cover plates shall be suitably protected before and during installation in order that the protective coating is not damaged.
   d. An ST4 mix concrete should be used for the bed and haunch of base units where cover plates are used.

8. Beany Block Stop End Top Unit
   a. The Beany Block Stop End top units should be used at any transitions from Beany Block to half battered kerbs.
   b. At the ends of Beany Block runs, these should be bedded onto freshly mixed concrete (ST1 mix to BS 8500-1&2) and kerb installation continued.
   c. Where they are to be used at dropped crossings, they should be bedded onto freshly mixed mortar and the dropper kerb and centre stone installation continued.

9. Beany Block End Caps
   a. Where the Beany Block run does not terminate at an outfall, the base unit shall be sealed using the Beany Block End Cap.
   b. The end cap shall be securely placed against the vertical end of the base unit and haunched with fresh concrete (ST1 mix to BS 8500-1&2).

10. Pavement Installation
    a. Where Beany Block is laid on or adjacent to existing or proposed concrete slabs, transverse joints shall be formed within the units and haunching adjacent to the slab joints and also longitudinal movement joints between the haunching and the slabs.
    b. Where necessary, the top unit drainage openings shall be protected against the ingress of material during concreting operations by covering with waterproof cloth tape.

In accordance with the Health and Safety at Work etc. Act 1974, the Manual Handling Operations Regulations 1992 (as amended 2004) and the Construction (Design and Management) Regulations 2015, risk assessments should be carried out to protect workers from risks associated with musculoskeletal disorders and work related upper limb disorders. This may require the use of lifting aids to assist installation.

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