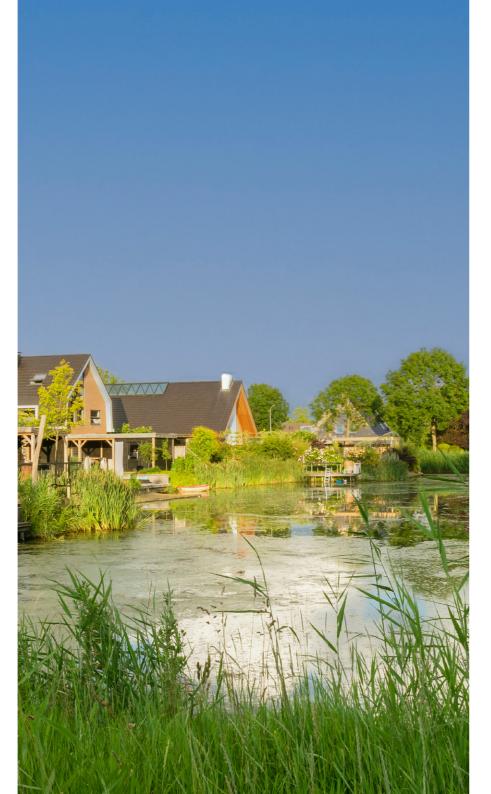


Practical advice, key information and preparing developments for Schedule 3



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Foreword

Most of today's drainage systems have been based on the rapid removal of surface water. While practical and familiar to developers, it has become clear this approach is no longer fit for purpose when severe storms and flooding are increasingly common.

One of the best ways to manage these threats is by slowing down water and managing it at catchment level. Though it's not just about the quantity; it's also about quality. People need buildings in which to live and work – and developers provide a valuable service in creating these places – but urbanisation is damaging habitats and one of the root causes is water-based pollution. Sustainable drainage systems (SuDS) seek to manage both of these issues with a more considered approach at source.

Schedule 3 is the legislative force behind SuDS. In England, it will likely come into effect in the next year or two, giving developers only a short window to prepare. ACO's earlier research has shown there is still some catching up to be done, which is why we've developed this guide. It provides an overview of the upcoming changes as well as some useful pointers for those still unsure how the theory translates into practice.

This change may seem daunting – and it will require an entirely new way of thinking – but ACO is here to support businesses through the new design and application process. With Schedule 3 in place, the built environment will be much better prepared for future challenges, in turn creating improved communities and enhancing wellbeing for both people and wildlife. There has never been a better time to get ahead.

Sam Hawkins, Head of Specification & Design **ACO Water Management**

Schedule 3: Why Clarity Is Needed

Schedule 3 will soon become a requirement for developers, be it residential, mixed use or commercial. Yet previous research from ACO showed there is still some confusion about the requirements of Schedule 3, and even some of the basic principles behind SuDS in general.

Our Highways Drainage report from 2022 found:



55% of respondents had worked on projects without maintenance of drainage factored in



99% said they faced at least one barrier when designing a SuDS project



Only 44% understood the Simple Index Approach featured in the SuDS Manual



53% admitted wildlife impact was an afterthought

Schedule 3 – Understanding the Incoming Changes

Fully understanding the impact of Schedule 3 requires some context.

Sustainable drainage systems (SuDS) are simple in principle. They bring together different water management practices so that modern drainage is more aligned with the flow of natural water processes. In this sense, SuDS follow a wider trend to incorporate greener infrastructure within the built environment as towns and cities grow.

By replicating nature, SuDS can lower the impact of surface water flooding, improve water quality and protect biodiversity. This is achieved by lowering flow rates, increasing storage capacity and managing pollution that, if left unchecked, will eventually reach the local watercourse. 1

Despite their simplicity, the legislation underpinning SuDS has not been applied consistently. This is partly down to devolution. In Scotland, for example, SuDS are already a legal requirement for all developments except single dwellings that drain to the water environment unless they discharge to coastal waters. Meanwhile, in Wales, new developments of more than one single dwelling house, or where the construction area is 100 sqm or more, requires SuDS for surface water. In England, however, SuDS have not been mandatory for planning applications despite being recommended for major developments – i.e. 10 or more homes or on areas greater than 0.5 hectares.²

Some expressed reservation regarding the need to make SuDS mandatory when they were first included as part of Schedule 3 in the Flood and Water Management Act passed in April 2010. It was thought that better planning would be sufficient in most circumstances, which then led to some confusion concerning what was actually needed in areas where SuDS appeared to be the preferred solution.

Longer periods of more extreme weather and the increased threat of flooding due to climate change have seen attitudes shift over the last decade. Now, it's no longer a question of how to manage nature during development but rather designing communities that work alongside it, benefiting both people and wildlife. As one article in Building Design points out, with increasing heatwaves, flooding and high winds, it's reasonable to ask if today's designs will still be fit for purpose over the next few decades, and whether there is more that could be done to improve their performance before construction takes place. 3

Source: ACO Highways Drainage report 2022

¹ https://www.bgs.ac.uk/geology-projects/suds/

https://thefloodhub.co.uk/blog-should-england-make-sustainable-drainage-systems-suds-mandatory-on-new-developments-like-wales/

https://www.bdonline.co.uk/opinion/whats-stopping-us-from-designing-more-resilient-buildings/5120207.article

What is Schedule 3?

Schedule 3 has always been part of the Flood and Water Management Act 2010, but it was never enforced. That is now changing. In January 2023, facing increased pressure from industry, the government announced it would be looking to fully implement Schedule 3 in England, making SuDS mandatory for all new developments.

and adoption of drainage systems, a sustainable drainage system approving body within unitary and county councils, and national standards on the design, construction, operation, and maintenance of sustainable drainage systems for the lifetime of the development. It also makes the right to connect surface water runoff to public sewers conditional upon the drainage system being approved before any construction work can start.

Here are two important passages from the review document that led to Schedule 3 becoming a legal requirement:

approval from a SuDS approval body (SAB) ... The SAB must decide if the application meets the SuDS mandatory standards. Under Schedule 3 to the Floods and Water Management Act 2010, the SAB would approve any construction work that has drainage implications before it is commenced and adopt drainage systems where applicable.

66 National planning policy requires SuDS to be considered in all major developments and in all developments in flood risk areas. 99 5

In other words, Schedule 3 outlines the requirements for the inclusion of SuDS in any construction project that creates surface water discharges. It removes the automatic right to connect to public sewers, instead, you will be required to satisfy the SAB first. These approving bodies then determine if the drainage proposal adheres to a technical national standard produced by the Department for Environment, Food and Rural Affairs (Defra). You can read more about that **here.**

Schedule 3 is not limited to new developments; it also applies to renovation work that involves multiple dwellings or projects over 100 sqm. For instance, a betterment would be necessary if a landlord acquired two semidetached houses with the intention of renovating them into one larger property.







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What Is Exempt?

Schedule 3 is intentionally wide in scope

the frequency and severity of flooding after heavy rainfall. Around 5.2 million properties in England are currently at risk of flooding according to the Environment Agency, so it's important not to worsen matters through poorly planned developments. 6

Wide adoption of Schedule 3 also promotes a more sustainable built environment, tying in with other requirements such as Biodiversity Net Gain (BNG), which became mandatory for most major developments in February 2024. Small sites are to follow in April 2024 and requirements for Nationally Significant Infrastructure Projects are expected to come into effect in 2025.

However, there are some developments exempt from SAB approval. These include:

- Single dwellings under 100 sqm according to implementation in Wales
- Highways though coverage in England is being considered
- Nationally significant infrastructure e.g. HS2
- Crown land e.g. Ministry of Defence

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/292928/geho0609bqds-e-e.pdf

https://consult.defra.gov.uk/defra-net-gain-consultation-team/consultation-on-biodiversity-net-gain-regulations/supporting_documents/ Consultation%20on%20Biodiversity%20Net%20Gain%20Regulations%20and%20Implementation_January2022.pdf

Potential Issues and Responsibilities

Most of the statements in Schedule 3 and the government's latest review are clear, though there are some that pose practical questions for both the SAB and the developer responsible for installing the drainage system.

Operation and maintenance costs are two issues that remain unresolved. According to the government's Schedule 3 review document, the SAB has a duty to adopt SuDS and is responsible for ensuring it's maintained according to the national standards:

responsible for ensuring the adopted drainage system is maintained by following statutory SuDS standards. Securing a sustainable funding mechanism for the lifetime of the development will be a key aim of the SAB. They have a responsibility for the management and maintenance of SuDS assets. The effectiveness of SuDS and the associated multiple benefits will rely on proper maintenance. ***

How this 'funding mechanism' will work in practice is unclear. The government's review listed three potential options, including a developer contribution via a commuted sum or a charge for surface water for homeowners as part of water bills. Households could also seek a rebate on their water bill and pay a service charge of the same amount to the SAB. As it stands, a commuted sum is considered the best option, as it's already used in Wales and is a well-established practice for the maintenance of other assets in England.

However, there are differing opinions about its effectiveness among local authorities and a final decision has yet to be made. As the review document points out:

in England, it will be essential to develop standard commuted sums guidance for funding SuDS. A regulatory impact assessment will be completed during policy implementation and provide the costs and benefits in full to help inform the best decision on funding including of the operation and maintenance costs.

It is also important to note that the SAB only assumes responsibility for the drainage system if certain conditions are met. The developer will need to carry out remedial work if the installed system deviates from the agreed plan or is not completed according to the national standards.

 $www.susdrain.org/files/resources/The_review_for_implementation_of_Schedule_3_to_The_Flood_and_Water_Management_Act_2010.pdf - Page 2010.pdf - Page 2010.pdf$

⁹ www.susdrain.org/files/resources/The_review_for_implementation_of_Schedule_3_to_The_Flood_and_Water_Management_Act_2010.pdf - Page 19

Perceived Cost

How drainage is costed will change upon the implementation of Schedule 3. Currently, storm drains are required to cope with increased surface water flow. But SuDS are designed to hold more water at source, meaning there is less need to make upgrades downstream. This is an important saving given that some developers have expressed concern about the increased cost to incorporate SuDS in new developments.

In isolation, SuDS can be more expensive than traditional drainage methods, and more room is required to build

certain features such as infiltration basins, attenuation ponds and swales. But there's a value-added aspect to SuDS that needs to be considered. They lower the risk of flooding – as well as the number of insurance claims that follow heavy storms – and enhance the local area through increased green space. Alongside this, there are longerterm, intangible gains too, as natural greenery will improve air quality and lower pollution that can harm people and animals. Some industry figures have also pointed out that lost revenue can usually be reclaimed as the amenity benefit justifies a higher sale price.

New Build or Renovation? ACO Can Help

In some areas of England there will be limited space and developers will need to negotiate pre-existing structures when incorporating SuDS. Certain projects will offer some opportunities – playgrounds for example can double up as infiltration basins during more intense, prolonged rainfall events – but others will require 'hard' or 'engineered' SuDS to adequately address quantity and quality.

Whether it's a large new-build development or smaller renovation project, ACO has the knowledge and design software to guide a project successfully.

Visit www.aco.co.uk/design-+-support-services

A Brief Overview of the SuDS Manual (C753)



SuDS in modern developments has been a topic of industry debate for several decades. As such, there is a wealth of information available to those who are unfamiliar with the subject. The SuDS Manual C753, written by industry research body CIRIA, is arguably the most important of these resources. It deals with planning, design, construction, operation and maintenance of SuDS. 10

The conversation has developed since it was first published in 2007 through to the current 2015 version in use today, though it still remains the most comprehensive reference for both developers and local authorities. Those who are completely new to the topic should refer to C753 in the first instance, as it provides the best

introduction with all main points and guiding principles covered. That said, it's still important to engage with manufacturers and other industry experts when implementing a plan because the document doesn't explain how exactly designs are put into action. This is especially important given the uncertainty still surrounding disputes when a developer's finished design deviates from what the SAB originally approved.

C753 explains SuDS best; however, this section reiterates some of its key points to give readers better context in the following sections of this

SuDS not only manage the flooding and pollution aspects of drainage, but they also ensure that community and wildlife are considered in the final design. On developments where SuDS are not in place, rain from roofs, roads and other hard surfaces collects into gullies, channels and pipes before being released into the local river network or sewer system.

This not only worsens the impact of heavy rainfall but also allows silts, oils and other pollutants to spread before they can be trapped, removed or broken down naturally. Wetlands, watercourses and other habitats are harmed throughout this process and residents are less likely to develop a positive connection with their local area. 11

SuDS address these issues through four criteria:



QUANTITY

SuDS lower the risk of flooding and erosion by controlling flow and frequency of surface water runoff



QUALITY

SuDS prevent and treat surface water runoff pollution to protect the local environment



AMENITY

SuDS improve the local area by creating more attractive and usable environments. managing flow volumes more effectively



BIODIVERSITY

SuDS create space for wildlife and enhances habitats



All pillars of SuDS should be considered equally, though biodiversity has often been the pillar that is first to be sacrificed if budgets are squeezed or if there is an onus on maximising the development. However, it should not be an afterthought within SuDS and is integral to the approvals process. As chapter 6.2.3 of CIRIA's manual points out:

66 The habitats within any new SuDS scheme should, where possible, link with other local and/or regional habitats to help build and enhance habitat connectivity within neighbourhoods and between rural/ suburban areas and towns/cities. This will help mitigate the problems associated with habitat loss and fragmentation within urban areas. The SuDS design should consider existing or future planned habitat corridors and networks, and evaluate how the SuDS on the site can best support or contribute to these wider objectives by providing linking habitats or stepping stones – allowing wildlife to move from and to rural areas, as well as being urban habitats in their own right. 99 12

This highlights the need to work with consultants, ecologists and manufacturers who develop products with biodiversity in mind. ACO, for example, set up Habitat Matters, a sophisticated mapping tool that connects communities to infrastructure and nature.

13

You can read more about that **here**.





¹⁴ ACO's Wildlife Range

ACO has a range of useful SuDS products designed with biodiversity in mind. These include:

- Climate Tunnel
- Guide Wall
- Permanent and Mobile Fences
- Stop Channel
- Wildlife Kerb

For a full breakdown, click here.



Flow Management

🗽 drainage areas. Simple, regular maintenance also forms

- Collect
- Clean
- Hold
- Release and reuse

- **Vegetation** e.g. filter strips and swales to filter
- **Permeable structures** e.g. filter drains, green
- Infiltration devices specific features that allow
- Open depressions e.g. basins, ponds and
- **Engineered structures** e.g. geocellular boxes,

Addressing Water Scarcity

On the other extreme to flooding, is the challenge of water scarcity, or drought, which presents an equally pressing concern. As climate variability increases, the need for sustainable water management solutions becomes more critical, encompassing not just flood prevention but also the conservation and reuse of water resources.

Smart Attenuation

Smart attenuation systems, a cutting-edge advancement in SuDS technology, offer a dynamic solution to managing water resources efficiently in both flood and drought conditions. These systems intelligently control the release of stored water, maximising its availability during dry periods. By utilising real-time data and adaptive control mechanisms, smart attenuation can optimise water storage from heavy rainfall periods for irrigation and other non-potable water uses during times of scarcity. This not only mitigates the impact of drought but also enhances urban water resilience, ensuring a sustainable balance between water retention for flood prevention and the strategic release of water to combat water scarcity.

In contrast, blue roofs are designed to collect and hold rainwater, releasing it slowly to mitigate flood risk or repurposing it for non-potable uses such as irrigation. Together, these solutions demonstrate the multifunctionality of SuDS, turning buildings into active contributors in urban water management.

Closing the Loop

In the face of drought, the reuse of greywater and harvested rainwater for irrigation is essential. By treating and repurposing water onsite for landscaping purposes, developments can significantly reduce their demand on urban water supplies and enhance their resilience to water scarcity. This practice not only conserves precious water resources but also supports the health of urban green spaces, contributing to the overall sustainability of the built environment.

By preparing for both excess and scarcity, developments can ensure a sustainable, resilient future in the face of changing climate conditions.

Blue and Green Roofs

Blue and green roofs embody the innovative integration of SuDS principles into urban design to address both extremes of the water spectrum.

Green roofs, with their vegetation layers, act as natural insulators, reduce runoff, and enhance biodiversity.





Applying SuDS

Good SuDS are achieved through considered design and consultation with different stakeholders, including planning authorities, environment agencies, internal drainage boards and manufacturers. This may appear to complicate established ways of working but any complexity can be tackled by dividing SuDS into stages.

An assessment of the different engineered works is key here, i.e. what is happening to the flow when it reaches each stage of a proposed design. This begins at the highest point, which is usually the roof of a building:

- Roof what is happening as water hits the roof, how is the flow being managed and what products are being used?
- Surface what is happening as the water leaves the roof and hits the next surface, does this need to be treated and stored and how is it being routed through the development?
- Exiting how is this water exiting the development and is it supporting local amenity and promoting biodiversity?

It's important for developers to begin thinking this way, not least because it anticipates exceedance paths – potential areas of failure where water deviates from the established route. In other words, what happens downstream if the design fails?

This is why it's important to engage specialists at the earliest stage. SuDS mean developers can no longer think solely in terms of density, maximising the space for buildings without leaving sufficient space for different catchment, storage and treatment techniques.

The following scenarios demonstrate how ACO's SuDS products can be applied in common developments.

SuDS in Practice Case Studies





Sustainable Services

THE PROJECT

Gloucester Gateway Services, Gloucester

THE BRIEF

To provide a SuDS drainage solution to reduce flood risk and help maximise biodiversity within the area.

THE SOLUTION

ACO KerbDrain, ACO Qmax and ACO SuDS Swale Inlet

The Gloucester Gateway M5 motorway services created a new sustainable standard in an area of outstanding natural beauty. With minimal landscape disruption, the structures are built into the undulating hills softened with organic forms and green roofs.

An ambitious landscaping solution required ACO to create a SuDS solution to manage and control rainwater run-off, and support habitats to enable wildlife to flourish. ACO KerbDrain, Qmax and Swale Inlets were combined to integrate with ponds, bioretention areas, filtration strips and wetlands. The scheme blended seamlessly into the surrounding landscape and created amenity areas for people and wildlife alike.

Setting the Standard

THE PROJECT

Asda Store, Leicester

THE BRIEF

To design an integrated drainage solution that combines proprietary and vegetative systems to achieve effective surface water management on-site.

THE SOLUTION

ACO Qmax and ACO SuDS Swale Inlet

Visitors to Asda Leicester experience a dramatically improved landscape with a level of biodiversity never attained before on a retail development. Both customers and residents benefit from an integrated drainage solution that combines proprietary and vegetative systems.

Nearby homes have an enhanced environment with trees, plants and water providing a natural dividing line, quelling noise, and providing a natural visual buffer. ACO channel systems integrate with granular sub-bases and filter strips which outlet via ACO Swale Inlets into detention basins and swales creating an impressive and efficient treatment train.





Guiding the Way

THE PROJECT

Ashridge Farm, Wokingham

THE BRIEF

22

To provide a system which can protect wildlife from the road and ensure habitats remained connected.

THE SOLUTION

ACO Climate Tunnel, ACO Guide Wall Systems

The Ashridge Farm project includes a newly constructed 550m roadway and residential area, which is accompanied by a 4.5-hectare open space that has been thoughtfully designed to safeguard and enhance the diversity of the local wildlife and surrounding community. The development features an "eco pond" that has been intentionally created to attract various forms of wildlife, such as newts, amphibians, and birds.

In order to avoid interfering with the habitats of the local fauna, ACO Climate Tunnels and Guide Walls were installed to help secure a safe pathway for mammals and amphibians as they cross the new road network. The entire scheme was planned with care and consideration to ensure that the wildlife and the ecosystem were protected.



Supporting nature

THE PROJECT

Rushden Lakes Retail Park

THE BRIEF

To design a SuDS drainage scheme which collected and conveyed surface water, while also offering an infiltration solution for tree pits.

THE SOLUTION

ACO KerbDrain, ACO Qmax and ACO StormBrixx

Rushden Lakes Retail Park is situated beside Skew Bridge Lake, a picturesque body of water that forms a part of the Nene Valley Wetlands. This expansive area encompasses four Wildlife Trust nature reserves, each providing valuable habitats and lagoons. Thanks to these conditions, the area has been able to support nationally important populations of various bird species. Over 200 trees were planted on the development, with the support of ACO solutions.

ACO KerbDrain and Qmax were installed as part of the SuDS management train to aid with surface water collection. Meanwhile, ACO StormBrixx, with its high void ratio, offered an effective solution for tree pits, providing ample root space and resistance to traffic loads. Oil interceptors were used to purify run-off on-site, ensuring water could be returned to the wetlands to help enhance and replenish the surrounding environment.





THE PROJECT

Madani Girl's School, London

THE BRIEF

To provide a blue roof solution to manage rainwater on-site, whilst providing an amenity space for the school to utilise.

THE SOLUTION

ACO RoofBloxx

Madani Girls' School, located in the Tower Hamlets borough of inner-city London, operates within a purpose-built Grade II listed Victorian building. To provide a high-quality teaching and learning experience for its students, the school sought to expand its facilities.

However, the site's inadequate ground conditions prevented the use of infiltration and other forms of Sustainable Drainage Systems (SuDS) to manage surface water, leaving attenuation as the sole viable technique. To address this challenge, a blue roof was selected to manage surface water effectively while also allowing for the multi-functional use of the roof space. ACO RoofBloxx was chosen for the project and demonstrated how rainwater can be sustainably managed with amenity in mind.



No Flooding in Site

THE PROJECT

Drummond Park, Ludgershall

THE BRIEF

To design a SuDS Infiltration tank system to reduce flood risk and support the development of 412 new homes.

THE SOLUTION

ACO StormBrixx

The development of Drummond Park is an exellent example of sensitive regeneration. The former Defence Medical Equipment Depot site has been repurposed to include new homes, a local school, and transport links and outlets. The development has helped to foster a sense of community within a beautiful countryside location.

In order to mitigate flood risks and support the surrounding environment, an infiltration tank was chosen to allow stormwater to slowly infiltrate back into the ground and soak away. ACO StormBrixx was selected for this purpose, and a customised stepped edge design was created to meet the site's boundaries. Sustainable construction was a crucial aspect of the project, and due to the innovative stackable design of StormBrixx, the carbon footprint resulting from transportation and logistics was significantly reduced, thus minimising the environmental impact.

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Next Steps

The enforcement of Schedule 3 will require a considerable change to current construction and design practices, especially for developers that have yet to develop SuDS on site. Those in this situation will understandably have further questions beyond what has been covered in this

guide. Susdrain, a community and resource for SuDS, has a useful document covering items such as source control, maximum areas and development on sites that have some level of contamination. You can find that **here**.



It's important to point out that SuDS in England will differ from those found in Scotland and Wales, where they've been a requirement for some years. This is partly down to the differences in landscape and weather, but also because the structure of local government functions differently in each of these regions. Learnings and best practice can be taken into account for English developments, but there will be some small but significant distinctions when Schedule 3 is fully implemented.

Alongside Schedule 3, the national standards that underpin SuDS are also under review:

consultation on and publishing of national standards for sustainable drainage. The SAB [SuDS Approval Body] will have a duty to approve SuDS which follow the national statutory standards. They will require good guidance to which they must have regard in relation to their approving and adoption functions. The review has baselined the information, guidance and standards that already exist in relation to SuDS and that implementation may affect. ⁹⁹ 13

Other passages in the review also point out that existing knowledge of drainage systems may not directly apply and could create a skills shortfall once Schedule 3 comes into effect. Given the potential complexity of some designs, it's important for developers to now begin engaging drainage experts. This will mitigate any disruption and ensure early adoption of SuDS is successful, lowering the risk of dispute between developers and SABs.

... some expertise already exists both in the construction industry and within local authorities, although this has not been quantified. We have been informed that in some areas, vacancies in the SuDS professions have not been filled and remain advertised for some time. This indicates there may be a skills and capabilities gap in the SuDS industry with not enough people entering the professions.

The review of Schedule 3 provides a full breakdown of what's needed ahead of implementation. You can read more about that **here.**

ACO has worked on SuDS projects for over 10 years. Gloucester Gateway Services is a standout example of our approach. You can read more about that **here**.

www.susdrain.org/files/resources/The_review_for_implementation_of_Schedule_3_to_The_Flood_and_Water_Management_Act_2010.pdf - Page 20

¹⁴ www.susdrain.org/files/resources/The_review_for_implementation_of_Schedule_3_to_The_Flood_and_Water_Management_Act_2010.pdf - Page 19



Find out more

To find out more about ACO's industry-leading products and unique approach, please visit **www.aco.co.uk** or contact us on **01462 816666**

