ACO and the Environment

MEETING GOALS WITH TECHNOLOGY

Applied Science

ACO's approach to water management is embedded in science; environmental science (study of the environment) is then applied to design technology in the development of solutions to environmental problems.

Consideration of the context of the whole functional application is always an essential part in the development of Eco-technology; ACO research and development incorporates detailed understanding of interfaces with, and integration of, living and non-living elements of natural ecosystems

Some brief examples are given throughout this document of how environmental science is applied to ACO's technological solutions for sustainability. More detail is available through ACO's CPD programmes.

Asda superstore, Leicester

ACO and the Environment

THE ENVIRONMENTAL GOALS

The Sustainable Development Goals (SDGs) are a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere. The 17 Goals were adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development.

The UK is committed to the delivery of the Sustainable Development Goals.

ACO support all goals but also recognise four specific areas in which we are able to apply our expertise to make a difference.

This document provides an overview of the SDGs that ACO are investing in to help make a difference. While the level of direct influence is realistically constrained to the scope of geography and particular areas of business, ACO believe that even the decisions and contributions made at the most local levels can help make a difference.

As a business ACO recognise the importance and the urgency of the need to act in addressing Climate change (SDG 13). This is a challenge that requires continual management and relentless commitment to improvement.

ACO products are well-known for their role in safeguarding urban infrastructure and communities (SDG 11), but they are also designed to protect vital resources: water, soil and the associated aquatic and terrestrial ecosystems (SDGs 6,15).

SEE | ACT | SUSTAIN

The following pages provide a top-level insight into ACO's three-stage approach to ensuring 'we make a difference'.

The first task is to SEE the challenges, then to ACT in creating solution components that are eventually incorporated into projects to help SUSTAIN our environments.

SEE | Crisis of Climate and Environment

SUSTAINABLE DEVELOPMENT GOAL 13 - Climate Action - Take urgent action to combat climate change and its impacts.

There are so many different elements that influence climate change, some very apparent, others less obvious. Whatever they are, the collective effect is an increase in the magnitude and speed of change.

It is change that impacts our lives in a very significant way, but it is vital to appreciate that it is also an existential threat to critical parts of our world's ecosystems.

United Nations Sustainable Development Goals Report 2019 describes climate change as "the defining issue of our time and the greatest challenge to sustainable development". Clearly the topics are linked, and as the pace of climate change increases, so must the pace of response in redressing both climate action and all other sustainable development goals.

Llŷn Peninsula - maintaining and expanding a continuous strip of diverse habitat around the coastline

ACO recognises the challenges

As a manufacturer, there is recognition of the ongoing challenge always to look at how to reduce environmental impact, both in manufacturing processes and in the design, delivery and final use of the products. The ACO business is committed to a variety of different policies and procedures in the ongoing drive for sustainability, including measures to continually reduce carbon emissions across all stages of the lifecycle. The chosen management tool for this activity is ISO-14001, which is managed and monitored by a focussed environmental management committee and ultimately 'owned' by the senior team.

ISO 14001

ACO's new products have been developed to enable reduced raw material use and reduced installation time, including transportation and on-site machine handling. A great deal of work is invested during the design process to ensure appropriate product lifespans, thereby proactively mitigating against repair and replacement that would necessitate further demand on resource and create additional carbon emission. Because most of the products are installed constituents in a larger construction project, detailed consideration is always given to reducing material

Sustainable Development

In 1987, the report 'Our sustainable future' was published by the UN Commission on Environment and Development, where sustainable development was defined as: "development that meets the needs of the present without compromising the ability of future generations to meet theirs." The report insists on the need to protect the diversity of genes, species, and all terrestrial and aquatic ecosystems in nature. It emphasised that delivering this would be possible via measures to protect the quality of the environment, and by the restoration, development, and maintenance of habitats that are essential to species.

Thirty-three years later, the work is more urgent than ever and the challenges at every level have increased in scale substantially.

ACO recognise this and are committed to making a difference.

The Oxford Word of the Year 2019:
climate emergency

Climate emergency

Climate emergency is defined as 'a situation in which urgent action is required to reduce or halt climate change and avoid potentially irreversible environmental damage resulting from it.'

The reduction of elements directly impacting climate change like CO2 are of paramount importance and remain critical both in the short and long term; alongside that ACO's product proposition is focussed on helping to address some of the rapidly growing environmental impacts caused by climate change.

Consideration of future generations is essential

ACT | What part ACO play in addressing sustainability issues

SUSTAINABLE DEVELOPMENT GOAL 11 - Make cities and human settlements inclusive, safe, resilient and sustainable.

Urban Infrastructure

This goal includes the need for the sustainable water management in ever expanding urban environments. Since the 1970s ACO have been helping protect the UK's built environment – the places we all live and work in. Today a dedicated design service supports a broad range of product developed to Collect, Clean, Hold and Release surface water. Safeguarding urban infrastructure, they are also designed to protect vital resources: water, soil and the associated aquatic and terrestrial ecosystems.

ACO Water Management products fulfil particular purposes in the creation of sustainable drainage solutions, managing both the volume and the quality of water. The ability to deliver the right quality and quantity of water into a specified location is an essential component in the creation of sustainable urban ecosystems, along with their surrounding environments and landscapes.

While the effective management of surface water flow and of water quality is critical in urban development, it is also vital in helping ensure the sustainability of vulnerable wetlands and sensitive and invaluable ecosystems, which in turn play a crucial role in the wellbeing of the human ecosystem.

4 Pancras Square - making space for water & urban greening

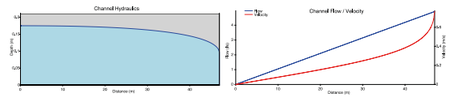
Collect

As urban development continues, so more of the natural landscape is replaced by impervious surfaces. The consequence is a dramatic reduction in infiltration of water into the ground and an accelerated flow of water to ditches, streams or sewers. It is vital that water is managed and conveyed efficiently not only to protect the built environment, but also so that it can be slowed and conveyed to a suitable point for cleaning or infiltration into the soil.

ACO channel systems are designed specifically to enable effective management of surface water for virtually any type of application – from Highways and Ports to Terraces and Parks.

Eco-tech - applied science: Collection

Designing for suitable collection and conveyance of surface water requires deep understanding of storm profiles, surface flow and the associated processes and environments.
Intense storms pose significant threat to the environment and its variety of ecosystems - whether it be through runoff volume, contamination or both. The graph below is from ACO's hydraulic software, designed to assist in the creation of schemes that will protect the environment.

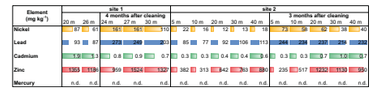


Clean

This critical element of the water management chain addresses the treatment of pollutants in surface water. It manages the basic but vital interception of hydrocarbons with ACO Q-Ceptor or ACO V-Septor, an advanced vortex separator that removes sediment-bound contaminants, to the capture of heavy metals in ACO Quadraceptor. Failure to incorporate this step frequently results in severe harm to water course and natural habitats and also irreversible damage to soil.

Eco-tech - applied science: Clean

The ongoing programme for ACO's 'Clean' systems requires a deep understanding of contaminants present on urban surfaces Detailed research is undertaken to understand the type of risk that exist for the environment and sensitive ecosystems. The extract below is from an extensive research project looking at the removal of sediments and associated pollutants in urban runoff

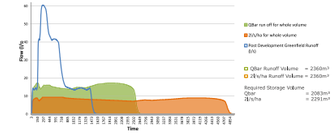


Hold

Attenuation systems are frequently used to help mitigate the adverse effects of urban development on flood risk. By attenuating surface water properly, the cleaning and infiltration or release can be managed much more effectively, thereby ensuring better protection of natural habitats in urban environments.

Eco-tech - applied science: Hold

Heavy storms pose significant threat to both the built environment as well as to natural infrastructure and the attendant ecosystems. Management of the water for attenuation and slow release or for infiltration requires detailed understanding and careful calculation.



Release

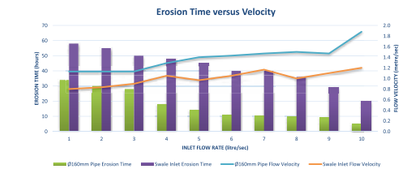
Controlled release of water is an essential component in managing surface runoff. In the event of a rainfall event, water will move far more quickly across manmade surfaces than it would the natural landscape. This can frequently result in quick short-lived flooding of water courses or more permeable surfaces. Frequently, such flooding is enough to badly damage or destroy ecosystem habitats.

ACO StormBrixx is designed to facilitate infiltration into soil thereby supporting ecosystems and replenishing groundwater.

ACO Q-Brake vortex systems are designed specifically to prevent downstream flooding by controlling the release of stormwater.

Eco-tech - applied science: Release

The development of the Swale inlet involved comprehensive analysis of the impact of swale inflow on soil erosion - critical to prevention of habitat damage, soil erosion and visual impact



Examples of applied science

Natural Infrastructure

SUSTAINABLE DEVELOPMENT GOAL 15 - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Ecosystems and Habitat

Because ecosystems are a community of abiotic (water, soil, air) and biotic (flora, fauna, animals) parts, they have to work together to achieve balance if they are to survive; consequently the 'habitat' is crucial to any ecosystem, providing organisms with food, water, oxygen, temperature and other elements that are needed.

If an ecosystem habitat is disrupted through an imbalance of abiotic or biotic parts, it can have destructive or even calamitous effects on species within the ecosystem.

Surface runoff containing pollutants

Pollutants create long term damage to ecosystems

The need to control elements that contaminate habitats is clear, but the challenge is multifaceted: pollutants come from many sources. Both biotic and abiotic pollution can be complex with different combinations interacting to produce serious damage. Every source of pollution needs careful consideration in terms of the best method of prevention or mitigation.

ACO Water Management's primary focus is the management of surface water quantity together with the provision of systems to mitigate against the potential damage caused by surface water runoff conveying pollutants into soil and watercourses.

ACO's Collect, Clean, Hold, Release approach is designed to "Protect" our urban environments in the context of water, but it is also designed to help "Protect" natural landscapes and vital ecosystems from contamination and by returning clean water.

Land degradation & loss of biodiversity and flora

Protecting WATER & ecosystems

Key facts highlight the challenge

"...In essence, only 0.007 percent of the planet's water is available to fuel and feed its 6.8 billion people." National Geographic (2015).

We recognise that the increased demand for water from humans risks depletion of supply for vital ecosystems we depend on. The challenge is stated clearly by Maggie Black in "The Atlas of Water":

"Water is fundamental to existence. Supporting life and economic activity at every stage of its journey, it is manipulated and controlled for the benefit of all our lives... We cannot create water but we can manage it better, much better."

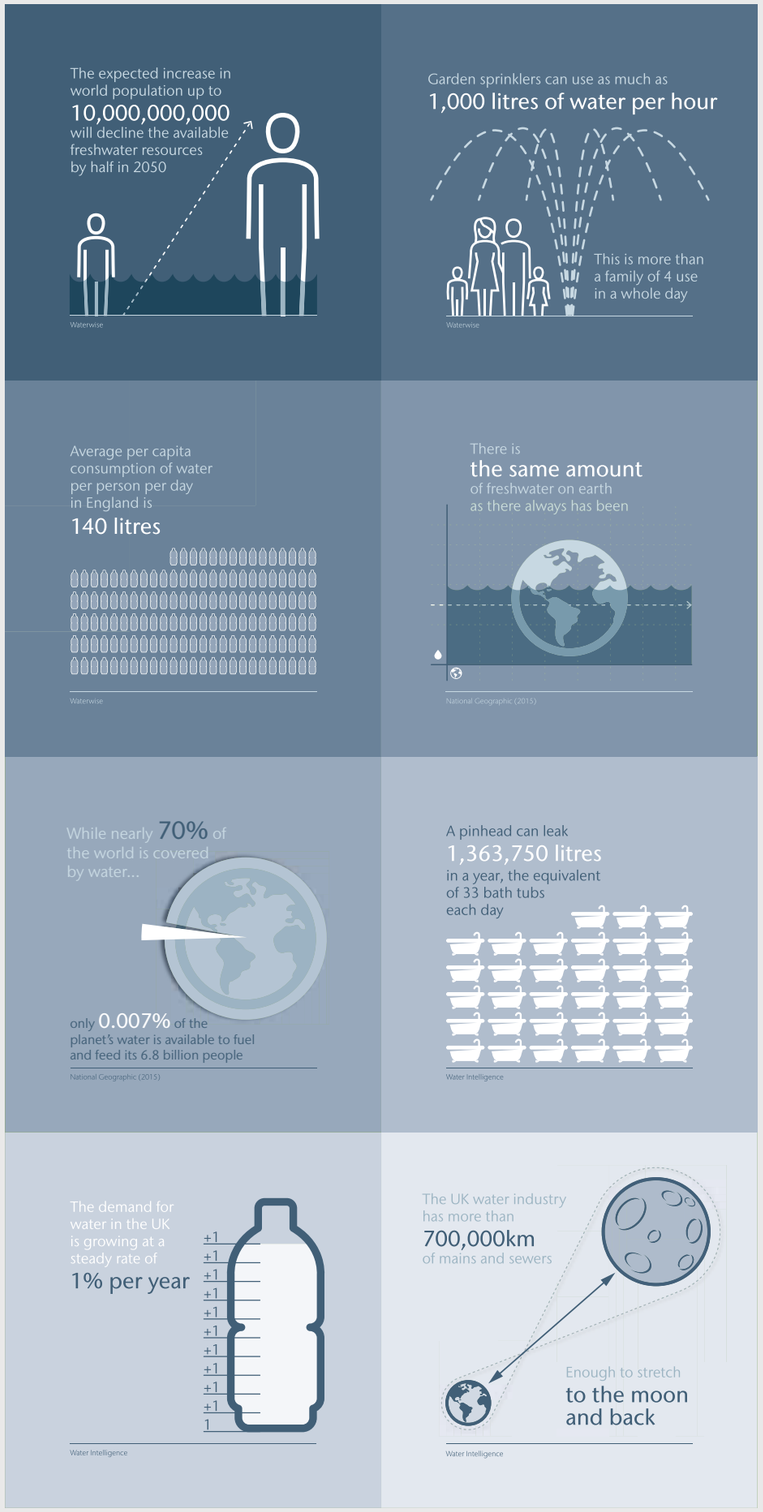
Protecting SOIL & ecosystems

Soil is considered a non-renewable resource that delivers essential ecosystem services, enabling life on earth. It has a direct connection with water and acts as an efficient 'cleansing agent', but considerable caution needs to be exercised to ensure that we are not exceeding the capacity of soils to absorb and "lock away" harmful pollutants and thereby become permanently damaged.

ACO systems are designed to collect and convey polluted water to suitable forms of treatment before infiltration into the ground, thereby helping safeguard habitats and soil function and services. "protecting" natural landscapes and vital ecosystems from contamination and by returning clean water.

Soil is considered a non-renewable resource, delivering essential ecosystem services, vital for life on earth.

1 Habitat for organisms
2 Flood regulation
3 Climate regulation
4 Nutrient cycling.
5 Provision of food, fibre & fuel
6 Water purification & contamination reduction
7 Carbon sequestration



The increasing demands on and for water

Protecting terrestrial and aquatic habitats

In 1989 ACO recognised the vulnerability of our aquatic ecosystems as a result of their involvement in providing drainage for roads and highways. Working with herpetofauna specialists, ACO developed a range of wildlife products specifically to help mitigate the negative impact of landscape transformation and the alteration in habitat for frogs, toads, newts and lizards, as well as products for birds, bats and hedgehogs.

Hedgehogs are on the UK Red List as vulnerable to extinction

Since amphibians live in two environments and have particularly thin skin that can absorb toxic chemicals and diseases, they are considered to be an important 'bio indicator species', giving scientists valuable insight into environmental pollution and how an ecosystem is functioning.

The value of this species is not only that of an indicator of health; they also play a crucial role in the food chain, both as predator and prey.

In the last few decades amphibian species worldwide have been hard hit. Because of their ecological characteristics, amphibians and reptiles are very exposed to the effect of habitat loss and the building of roads, whether it be as a result of lost connectivity or through the presence of pollutants.

The range of ACO fencing and toad tunnels together with ACO's water treatment products play an important role in helping to address some of the major threats created for wildlife by road systems.

The food chain in aquatic habitats

Toads -an important indicator species

ACO tunnels have been used to address habitat fragmentation since 1989

SUSTAIN | Controlling the environmental impact

It is generally accepted that sustainability in the context of construction can be a complex topic. For every project it is vital that a full understanding of environmental impact is made as early as possible.

ACO have developed strong support services to assist planners and designers, support that can help lessen the threat to our environment and its ecosystems. The most effective outcomes are always achieved through early, close working relationships with Clients, Designers and Constructors at all stages of the project.

The following examples give a brief insight into the type of sustainable solutions ACO help to deliver, both for the management of surface water and for the protection of habitats and biodiversity.

Solutions for sustainability

Management of surface water

Surface water flowing across a carpark, highway or any other sealed surface is frequently impaired by anthropogenic contaminants, which if unchecked, represent a major threat to the survival of a variety of aquatic flora, fauna and other aquatic species.

GLOUCESTER GATEWAY

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 Sustainable Drainage System controlling rainwater run-off, while providing a high-quality habitat for wildlife to flourish.

KerbDrain, Qmax and Swale Inlets were combined to integrate with ponds, bio-retention areas, filtration strips, and a wetland area, the scheme to blend into the facility's environment, creating amenity areas for people and wildlife alike.

HEYFORD PARK

The redevelopment of the Upper Heyford Airbase is an excellent example of sensitive regeneration.

Blending into a rural setting, Heyford Park's new homes are combined with retail outlets, creating a real sense of local community within a beautiful countryside location.

Development has carefully incorporated the landscape heritage and improved biodiversity. Sustainable challenges typical of land contamination have been addressed, whilst preserving a sensitive ecology that includes great crested newts and bats.

ACO RoadDrain and Swale Inlets were incorporated to feed attractive swales, enhancing wildlife habitat and improving the visual appeal of the development

ASDA LEICESTER

Visitors to Asda Leicester experience a dramatically-improved landscape with a level of biodiversity never attained before on a retail development.

Both customers and local 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.

MARKEATON PARK

As part of a £3.4m restoration project at Markeaton Park in Derby, ACO Water Management helped to enhance the main car park to provide a welcoming green space for current and future generations to enjoy.

As well as human visitors, wildlife is important to Markeaton; there 31 species of birds, including Herons, Woodpeckers, Kingfishers, Nuthatch and Pied Wagtail. The 85-hectare park is also home to five different species of bat.

With the carpark accommodating 3,142 sq metres of space, it was an area that needed a solution that would handle surface runoff as sustainably as possible - GroundGuard proved an ideal SuDS solution.

RUSHDEN LAKES RETAIL DEVELOPMENT

Rushden Lakes Retail Park overlooks Skew Bridge Lake, part of Nene Valley Wetlands, an area that includes four Wildlife Trust nature reserves with sites of special scientific Interest. This range of habitat and the varied topography of the lagoons provide valuable nesting, resting and feeding conditions to sustain nationally-important numbers and assemblages of breeding and wintering birds. The first phase included over 200 trees from 13 different species being planted throughout the 400,000 sq ft retail development.

The project was supported by ACO helping to manage surface water collection and conveyance with ACO KerbDrain and ACO Qmax together with the use of ACO StormBrixx for tree planting.

Protecting habitats and biodiversity

In 1989 ACO recognised the vulnerability of our aquatic ecosystems as a result of their involvement in providing drainage for roads and highways. Working with herpetofauna specialists, ACO developed a range of wildlife products specifically to help mitigate the negative impact of landscape transformation and the alteration in habitat for frogs, toads, newts and lizards, as well as products for birds, bats and hedgehogs.

PETERS VILLAGE, KENT

The new 1,000-home community at Peters Village in Kent has achieved remarkable success in the creation of homes with views of the River Medway that adjoin thriving wildlife habitats in the Peters Pit Quarry nature reserve.

Natural resources have benefited from sympathetic habitat creation and enhancement by Peters Village developer Trenport over the past decade. Notably, wildlife is using ACO tunnels beneath roads and trackways to move between the carefully-retained areas of green space, protecting them from vehicle traffic.

Great Crested Newts are using these tunnels to move between the designated Peters Pit and land beside the River Medway. This is a particularly important feature as it helps overcome fragmentation effects, when habitats are divided by roads, housing and industry.

GLASSHOUGHTON SOUTHERN LINK ROAD

The Glasshoughton Southern Link Road unlocks brownfield land within a former mining area helping to relieve congestion on local roads and improve local air quality.

Sustainability is at the heart of the development with the inclusion of trees, shrubs and “Bee friendly” wildflower planting on embankments to connect habitats along the road and preventing habitat fragmentation. A new wetland area will seasonally hold water, building in flood resilience while also creating habitats for small animals and insects including high value pollinators.

Special crossing points were created using ACO’s Guide walls to direct newts, toads and other amphibians to ACO Climate tunnels and providing them with safe places to cross roads without meeting traffic.

Sensitive environments close to Glasshoughton

MACALLAN DISTILLERY

The River Spey runs through the estate that is home to the new Macallan Distillery; it is a river that is designated a ‘Special Area of Conservation’ (SAC) and renowned for its purity and natural beauty.

In light of the river’s sensitive ecosystem the project had to give high priority to water quality and to issue’s relating to species and habitat. Spring-water boreholes are also used to supply the distillery.

With such sensitivities, surface water from building and roof has to be managed using sustainable drainage solutions in order to help prevent water pollution and flooding.

ACO Brickslot and Modular channel systems were used in conjunction with Facade drainage to collect and convey the water.

Overcoming fragmentation effects

ACO Climate tunnel and guide walls were used to overcome the fragmentation effects on habitats, created by new roads.

REDHILL BUSINESS PARK, STAFFORD

Staffordshire County Council has always been committed to protecting its natural environment and providing increasing biodiversity; with this particular project an interesting new challenge arose: it was found to be home to a population of Great Crested Newts.

With natural habitats – especially for amphibians – decreasing over the past few decades, the council was determined to find a solution that would protect the remaining habitats and safeguard the species' survival in the locality.

Newt populations are dependent on the ability to travel between closely-located ponds, linked by a suitable land habitat. Government guidance outlines that any building work that disconnects or isolates habitats by splitting them can cause great harm to Great Crested Newt populations.

ACO's Climate Tunnels were carefully integrated into the scheme to create a lasting solution.

MONKS CROSS, YORK

The development at Monks Cross North, York, is a much-needed housing development that will see around 970 homes built over the next ten years.

Sustainable development and amenity were vital parts of the planning, including sports pitches, a new primary school and public open spaces.

Key hedge lines and field ponds have been maintained to create attractive and distinctive spaces which protect the environment.

Three key swales link across the site, acting as SuDS corridors, preserving the habitats of migratory wildlife, including the Great Crested Newt.

The project was supported by ACO MultiDrain channel drainage, which conveys water across the urban areas, adding to the safety and amenity of the site.

COLLECT CLEAN HOLD RELEASE

- ACO Access
- ACO Building Drainage
- ACO Water Management
  Civils + Infrastructure
  Building + Landscape
- ACO Sport
- ACO Wildlife

ACO Water Management
ACO Building Drainage

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