FUTURE proof

News, views and comment celebrating mastic asphalt, the UK's most versatile building solution

Mastic Asphalt: The proven waterproofing solution for a greener future.

SUSTAINABILITY EDITION 2025

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CO_2NFIDENT

Welcome to this special edition of Future Proof, focusing on the many sustainability benefits of mastic asphalt.

Let's face it, when many architects, specifiers and developers think of mastic asphalt, sustainability isn't usually the first thing that comes to mind. Which is why so many people are genuinely surprised when they discover just how green a material it actually is. And how they can be totally – as our headline suggests – carbon confident in using it.

The built environment is responsible for almost 40% of global carbon emissions, so every aspect of construction - from material specification to installation methods - much be considered in the journey towards net zero. The materials used in construction and refurbishment projects offer a crucial opportunity to implement more sustainable practices.

Waterproofing plays an important role in sustainable design by preventing water damage, extending the lifespan of buildings and enhancing energy efficiency - ultimately contributing to a more environmentally responsible and cost-effective built environment.

Mastic asphalt is well recognised for being tough, durable and long-lasting, but what is perhaps less well known is that it is one of the most sustainable and greenest building materials currently available.

With an exceptionally long lifespan, low carbon footprint and 100% recyclability, mastic asphalt is helping architects, specifiers, developers and contractors to meet environmental goals without compromising performance.

In this special edition of Future Proof produced by the Mastic Asphalt Council (MAC) - the trade association for the mastic asphalt industry - we explore how mastic asphalt contributes to sustainable building practices.

From reducing embodied carbon and enhancing energy efficiency to supporting green and blue roof systems, mastic asphalt plays a key role in the future of eco-conscious construction.

Read on to discover why this traditional material is a modern solution for sustainable waterproofing.

Path to Net Zero

The UK government aims to reduce all direct emissions from public sector buildings by 50% and 75% by 2032 and 2037 respectively, against a 2017 baseline. All UK emissions are to reach net zero by 2050.

Source - Net Zero Government Initiative: UK Roadmap, December 2023

The Environmental Credentials of Mastic Asphalt

Sustainability has never been more important than it is right now. Many specifiers have an overall aim of creating energy efficient buildings that age gracefully and don't cost the earth to build or maintain.

Life cycle carbon modelling shows that long-lasting buildings requiring less maintenance are inherently more sustainable. Specifiers are thinking more and more about waterproofing solutions that last 100 years - not 20 - prioritising finishes that need minimum maintenance over the long-term and can be efficiently recycled at their end of life.

Many traditional waterproofing materials, such as synthetic roofing membranes, contain volatile organic compounds (VOCs) and other chemicals that can be harmful to the environment. The production process of these materials often involves the use of hazardous substances that can contribute to pollution.

100% Recyclable Material

By comparison, mastic asphalt is a proven waterproofing solution with significantly lower environmental impact. When mastic asphalt has reached the end of its long lifespan, it can be stripped back and reused again, providing it has not been overlaid or repaired with other products. This ability to be recycled and reused indefinitely makes it one of the most sustainable options currently available.

Many alternative materials such as complex multi-layered roof membranes can be incredibly difficult to recycle and this is not likely to change anytime soon.

Synthetic membranes typically end up in landfills, whereas mastic asphalt can be reheated and re-laid. This significantly reduces construction waste and supports a circular economy.

As mastic asphalt can be recycled once it has reached the end of its useful life in a project, specifiers can consider how it might be 'reclaimed' as part of a building 'deconstruction'.

Longevity and Durability

Durability forms a crucial part of sustainability. Materials that need frequent replacement contribute to environmental degradation by increasing waste and resources.

The Building Research Establishment (BRE) has independently accredited mastic asphalt to last at least 50-60 years, but there are many cases of asphalt roofs providing effective waterproof protection for 80-100 years.

For example, the rooftop of Buckingham Palace is protected with mastic asphalt and it has kept the building dry for well over 80 years. Mastic asphalt was also first laid at London's St Paul's Cathedral in 1906 and it provided well over 100 years' of effective waterproofing before it needed replacement. What's more, approximately 20 tonnes of the original mastic asphalt was saved and stored on-site, and then reused just nine months later for a paving project on the North Courtyard.

The long-term performance of mastic asphalt ensures less frequent replacement, less disruption and lower material consumption over a building's life cycle.

All Natural

Unlike many waterproofing materials that rely on synthetic chemicals, mastic asphalt is primarily composed of naturally occurring materials such as limestone aggregates, bitumen and sustainable additives. It contains no plasticizers or harmful chemicals, making it far safer for the environment.

Recognising the energy use and carbon emissions associated with its production, the mastic asphalt industry collaborated to achieve a world first: in 2008, the sector collectively achieved the CarbonZero standard, and since then has contributed to projects that reduce greenhouse gas emissions and support local communities around the globe.

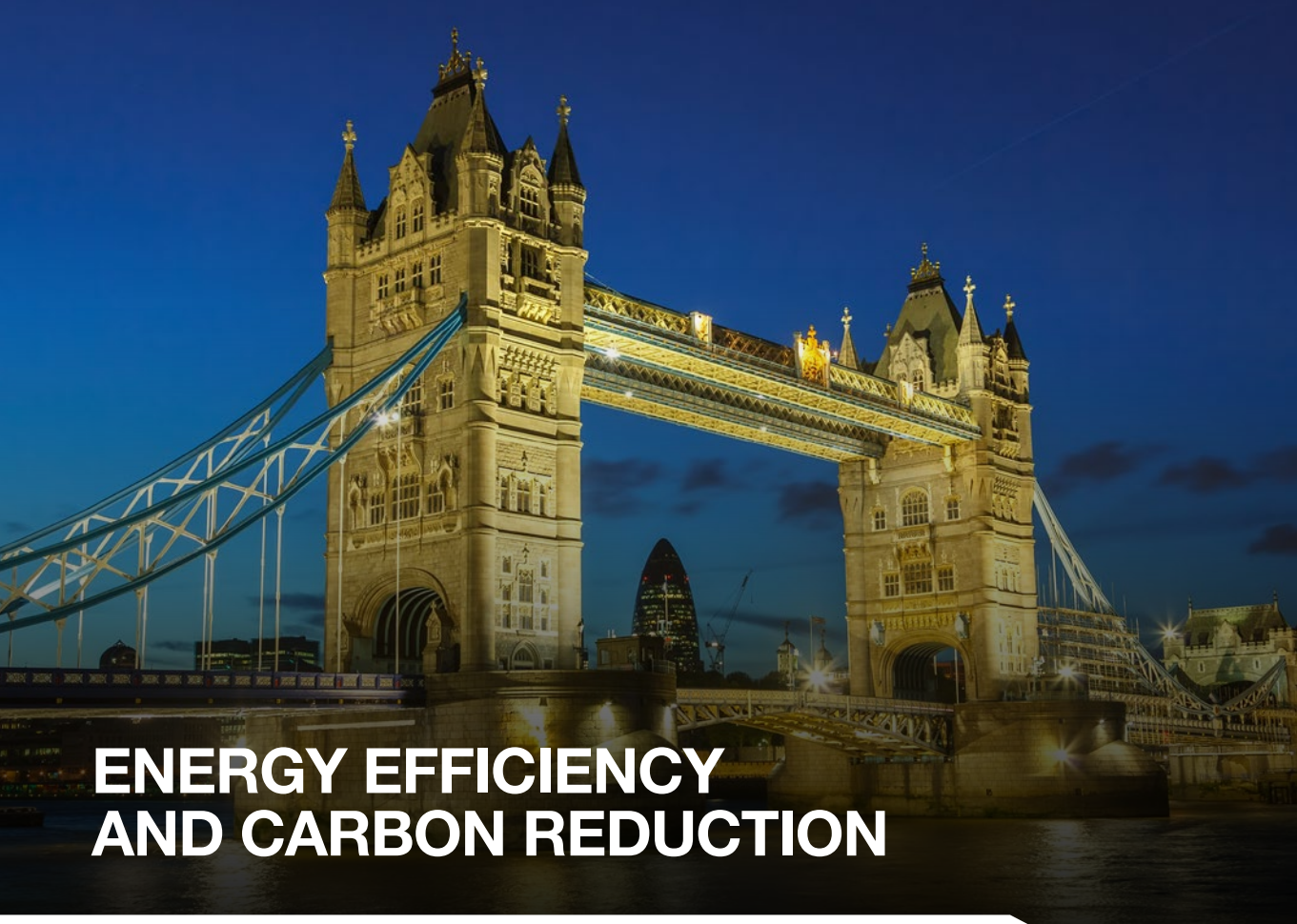
UK Manufacture

Mastic asphalt is manufactured in the UK using locally sourced materials. For major projects, mastic asphalt is usually taken to site by hot charge transporters or insulated dumpers direct from the manufacturer and taken to the point where it is needed for rapid installation - a huge advantage for projects with time constraints.

Mastic asphalt can be laid very swiftly. One 18 tonne hot charge delivery vehicle can supply sufficient mastic asphalt to cover 360m^2 of material to a depth of 20mm, which can be laid and finished in a matter of hours. What's more, mastic asphalt does not require any naked flames during the installation process.

UK manufacturing brings a whole host of benefits, including reduced impact from delivery miles, lower transport costs and a reduction in lead times.

In summary, by using mastic asphalt, specifiers and contractors can significantly reduce a project's environmental impact whilst ensuring superior waterproofing performance.



ENERGY EFFICIENCY AND CARBON REDUCTION

Energy efficiency is an important factor in sustainable building design.
Mastic asphalt has excellent thermal mass properties, meaning it can help regulate indoor temperatures by absorbing, storing and slowly releasing heat. This reduces the need for artificial heating and cooling, lowering energy consumption and improving the overall efficiency of buildings.

Recent advancements in the production of mastic asphalt have led to the introduction of carbon-neutral versions, which balance their carbon emissions through offsetting measures such as carbon sequestration and renewable energy use. By choosing carbon-neutral mastic asphalt, specifiers can significantly reduce the embodied carbon of their projects whilst maintaining high-performance waterproofing.

Carbon Offsetting

The first step in emissions reduction is reducing them at source, through more efficient processes. Carbon offsetting can then be used to mitigate unavoidable residual emissions, rather than being a means to justify inefficiency.

The CarbonZero standard was developed by CO2balance, who offer internationally approved carbon credits to organisations looking to make that last step in achieving their emissions goals.

The credits support projects developed under the Gold Standard Foundation, and which reduce emissions while also contributing to the UN's sustainable development goals.

It is common for individual companies to use carbon offsetting, but the Mastic Asphalt Council's decision in 2008 to meet the CarbonZero standard as a whole represented a world first.

Real World Examples

For the past 15 years, Mastic Asphalt Council member IKO has worked with CO2balance on energy-smart projects in Africa.

Money raised through a system of self-imposed levies are used to help support a range of environmental initiatives, such as providing energy efficient cooking stoves to Kenyan communities and fresh water bore hole projects in Uganda.

Through using more energy efficient brick stoves, villages in Kenya reduce their consumption of firewood by 50%. This has multiple benefits alongside the reduced emissions from burning less firewood, including reduced deforestation and better air quality inside homes. In Uganda, rehabilitating boreholes supplies families with fresh, clean water. No longer having to boil water to make it safe reduces firewood consumption.

The latest results show that IKO offset 8,892 tonnes of CO_2 through these projects in just one year. Since 2015, IKO has offset 18,156 tonnes of CO^2.

Closer to home, IKO's CarbonZero mastic asphalt solution has also been used to renovate Tower Bridge, one of London's most iconic landmarks which is used by thousands of people every day. MAC member Infallible Systems installed over 400 tonnes of mastic asphalt, equating to 50.11 tonnes of CO_2 offset.

A major project has also been completed at Four Squares Estate in Southwark, whereby IKO was asked by Keepmoat and Southwark Council to investigate issues relating to the existing access walkways. It was agreed that mastic asphalt would be used for the refurbishment, along with screed repairs and new expansion joints. During the works some 1,400 tonnes of mastic asphalt was applied and in terms of impact, this is the equivalent of 218.4 tonnes of CO_2 offset.

SUSTAINABILITY IN ACTION
THE HARRIS

Mastic asphalt was used for the sympathetic restoration of a 130-year-old Grade I listed building in Lancashire to ensure its preservation for future generations.

This is a fantastic example of sustainability in action as a total of 55 tonnes of mastic asphalt was stripped up and 55 tonnes of asphalt was put back.

The Harris is a Museum, Art Gallery and Library in the heart of Preston. A cherished cultural institution, the roof refurbishment was carried out as part of the £16 million 'Harris Your Place' project which is designed to restore and reimagine the Harris for 21st-century audiences as a cultural learning space. It is one of the most ambitious cultural projects in the North of England with the aim of securing the future of the Harris and relevance for the next 100 years.

The project will protect the building and architecture whilst enhancing accessibility options and positioning the Harris as a community hub for Preston and Lancashire, aiming to attract an additional 100,000 visitors per year, to a total of 460,000.

The main contractor for the project was Conlon Construction and the roof refurbishment was carried out by Mastic Asphalt Council (MAC) contractor member NRA Roofing and Flooring Services.

The Harris owes its name to Edmund Harris, a Preston lawyer who left £300,000 in his will to establish a trust and support a public Library, Museum and Art Gallery. The building was designed by local architect James Hibbert who chose a Neo-Classical style and it officially opened in 1893.

The Harris was granted £4.5m from the National Lottery Heritage Fund for the once-in-a-generation remodelling and refurbishment project, from the roof to the basement and everywhere in between. Renovation work was carried out over a three-year period and as part of this, over 100,000 collection objects were removed from the building and placed into safe storage.

Mastic asphalt was chosen for the roof refurbishment at the Harris, as like many heritage buildings, it was originally protected with asphalt. NRA Roofing and Flooring Services stripped the roof back to its original concrete deck and re-roofed the structure with a system comprising two coats of mastic asphalt backed with a 20 year warranty. Totalling an area comprising 950m², two coats of solar reflective white paint were applied to the top surface to provide additional UV protection.

There were some highly challenging logistical issues to overcome during the roof refurbishment which was carried out over an 18-week period. With no crane, all the stripped up and new mastic asphalt was lifted via hoist. NRA Roofing and Flooring Services also had to deal with some tricky detail work due to mechanical and engineering plant on the roof.

Craig Chaplin, Director of NRA Roofing and Flooring Services said: "This was an extremely challenging project logistically, but the finished result looks fantastic. Mastic asphalt was ideal as it is so hard-wearing and enabled other trades such as scaffolding to work at the same time as we were re-roofing the building. We're proud to have played a key part in this historic project."

The Figures

55 tonnes of mastic asphalt stripped and put back

8.61 carbon emissions and number of carbon credits

CO_2

Split by:

4.31 African Safe Water Project

4.31 African Improve Stove Project

The Impact

Safe Water

37 litres safe water/day

5 people impacted

31 minutes saved per household, per day

15kg wood saved per day

Improved Stoves

7 people impacted

2 stoves

54 minutes saved per household, per day

11kg wood saved per day

A green roof installed at Keble College - one of the largest colleges at the University of Oxford with over 800 students - was considered so impressive that it was named Heritage Project of the Year at the Mastic Asphalt Council Awards in 2024. The college dates back to 1870 and mastic asphalt has been widely used for protection of various roof areas over the years due to its sustainable properties and suitability for heritage buildings.

This latest project related to a high quality 350m_2 installation of IKO's Permaphalt system on the college's student bar roof. As mastic asphalt had previously been used, the college wanted to maintain the aesthetic consistency, however the asphalt finish needed to be painted with white solar paint, which would reflect onto the higher-level windows surrounding the single-storey building. To address this issue and enhance the environmental credibility of the project, a green roof was proposed and ultimately chosen by the college.

MAC members Oxford Asphalt Company and IKO collaborated on the installation, utilising the IKO Permaphalt system to create a durable, watertight, aesthetically pleasing roof. A 20mm thick layer of IKO Permaphalt was applied in two 10mm coats on IKO black sheathing felt separating membrane, ensuring a seamless and impermeable waterproofing barrier.

SUSTAINABILITY IN ACTION

KEBLE COLLEGE

The final coat was rubbed with clean coarse sand for a refined finish, enhancing the roof's appearance.

On insulated sloping timber surfaces over 5 degrees, a 20mm thick layer of IKO Permaphalt was laid in three coats onto expanded metal lathing over IKO black sheathing felt fixed to the slopes. This application not only provided robust waterproofing, but also improved the building's thermal efficiency by reducing heat loss through the insulated roof.

To ensure complete protection, even at vulnerable points, a two-coat solid IKO Permaphalt angle fillet was formed at junctions to flat and upstand areas. This attention to detail guarantees the long-term performance and integrity of the waterproofing system, safeguarding the building from water damage.

This project presented several challenges that required expertise and innovative solutions. Firstly, some roof areas had slopes that necessitated input from IKO regarding mechanical fixings. Pull-out tests were conducted on the fixings to ensure their stability and effectiveness. Due to the building's listed status, the low parapet could not be altered. This limitation meant that the detail had to remain the same and only 50mm of insulation was able to be installed.

The Oxford Asphalt Company's commitment to health and safety was evident throughout. A segregated route to the roof was established to keep students clear of the work area. A shallow ramp was created for safe access to the roof for asphalt delivery.

Despite the challenges faced, the Oxford Asphalt Company, in collaboration with IKO, delivered an outstanding project with sustainability at its core.

SUSTAINABILITY IN ACTION

MOD, SHOEBURYNESS

MOD Project Wins Award in Recognition of Sustainable Waterproofing

NFRC
LEADING ROOFING EXCELLENCE

A highly challenging refurbishment project carried out at a Ministry of Defence (MOD) site in Essex has been declared the winner of the mastic asphalt category at the UK Roofing Awards 2025 organised by the National Federation of Roofing Contractors (NFRC).

Sustainability was a key element of the waterproofing project carried out by MAC contractor member Fraden Contracts at military installation MOD Shoeburyness located in Pig's Bay in Essex. Covering a land area of 9,300 acres with another 35,000 acres when the tide goes out, MOD Shoeburyness has been a weapons testing site for more than 170 years.

Mastic asphalt was specified for a 800m$_2$ refurbishment project at the site, due to its suitability for heritage projects.
A total of 40 tonnes of existing black rock asphalt was stripped up, melted and relaid due to the listed building status.

Once the existing asphalt had been removed, it was re-installed in accordance with MOD heritage building guidance. Mastic asphalt was installed on the roofs, walkways, electrical boxes and lead cover flashings.

Fraden Contracts worked alongside English Heritage to maintain the original look of the listed buildings. Several logistical challenges were overcome, such as gaining access to small roofs using scaffolding that had been carefully erected so as not to damage the listed building.

As would be expected on a MOD site, security was extremely tight and operatives and deliveries had to be planned in five working days ahead of schedule. Site access was restricted during MOD testing as the site provides a closed and controlled environment for testing weapons systems at various stages of development, for safe disposal of expired ammunition and for live ammunition training in Explosive Ordnance Disposal techniques.

Fraden Contracts worked very closely with the client to determine the sequence of works and scaffold and access requirements per listed building.

The Figures

40 tonnes of mastic asphalt stripped and put back

6.26 carbon emissions and number of carbon credits

CO_2

3.13

Split by:

3.13 African Safe Water Project

3.13 African Improve Stove Project

The Impact

Safe Water

27 litres safe water/ day

4 people impacted

23 minutes saved per household, per day

11kg wood saved per day

Improved Stoves

1 stove

5 people impacted

39 minutes saved per household, per day

8kg wood saved per day

The Future of Mastic Asphalt in a Greener, Safer World

The push for more sustainable building materials is reinforced by regulatory bodies and green building certifications. These include BREEAM (Building Research Establishment Environmental Assessment Method) standards which recognise the importance of durable, low carbon materials in sustainable construction.

Achieving Net Zero

With an aim of reducing all direct emissions from public sector buildings by 50% and 75% by 2032 and 2037 respectively, the UK Net Zero Strategy encourages the adoption of circular materials and carbon-neutral solutions.

Governments worldwide are implementing stricter requirements for material sourcing and carbon emissions, making sustainable waterproofing materials such as mastic asphalt even more valuable.

The mastic asphalt sector has an important role to play in the pathway to net zero construction, and great strides forward are being made by increasing the use of recycled aggregates, improving energy efficiency in production processes and expanding initiatives such as carbon offsetting schemes.

Mastic asphalt is set to remain a key player in eco-friendly waterproofing for years to come.

Fire Safety & Flame-Free Application

Fire safety is a major consideration and mastic asphalt meets all relevant fire standards. By utilising flame-free roofing systems, fire risk from naked flame is eliminated and buildings can remain open and fully operational during roof refurbishment work if required. This is particularly important for work carried out in schools, hospitals and health facilities, as there is minimal disruption. As mastic asphalt is laid in molten form, it can be confused with other types of waterproofing membrane that require naked flame or torch on application. In reality, there is no naked flame at the point of installation.

The high mineral content of mastic asphalt also means that it fulfils all the external fire resistance required for a roof covering and achieves the highest rating (AA) when tested in accordance with BS476 part 3:1975. In addition, mastic asphalt flat roof waterproofing systems from the leading UK manufacturers achieve Fire Classification Broof(t4) in accordance with EN13501-5.

Contact us on 01273 242778 or email info@masticasphaltcouncil.co.uk for more information.

Applications in Sustainable Construction

When choosing sustainable roofing materials, there are multiple considerations to take into account. Structural integrity, thermal efficiency and the impact on the broader environment to name a few.

As cities expand and climate change intensifies, urban areas face challenges such as increased heat retention and flooding due to poor drainage. Green roofs and blue roofs present effective solutions to help address these issues, and mastic asphalt plays a key role in their success.

Green Roofs & Blue Roofs

Both green roofs and blue roofs are designed to enhance urban sustainability whilst making better use of the valuable and useable space in city centre locations.

Mastic asphalt provides a durable, watertight base for green roof systems, allowing for the creation of vegetated surfaces that improve biodiversity, enhance air quality and provide natural insulation. These roofs help reduce the urban heat island effect by cooling surrounding areas and lowering energy demand for air conditioning.

Blue roofs are designed to collect rainwater as it falls, and then release this same rainwater slowly and steadily over a 24-hour period. They present an effective stormwater management solution in areas where flooding and excess water are an issue. Mastic asphalt's seamless, waterproof finish makes it ideal for use in blue roof systems, helping to prevent flooding and reduce the burden on urban drainage networks.

Zero Waste

Mastic asphalt installation is a nearly zero waste process.

Unlike roll-on waterproofing membranes that generate significant offcuts and excess materials, mastic asphalt is applied in a molten state and used precisely as needed.

Any leftover material can be reheated and reused, eliminating unnecessary waste and reducing environmental impact.

Comparison With Alternative Waterproofing Systems

When compared with alternative waterproofing systems, mastic asphalt can offer the lowest life cycle costs over a 60 year period, when the typical refurbishment and replacement requirements for each system are taken into consideration.

It is the longevity and durability of mastic asphalt that makes it the best value solution. Though alternative waterproofing membranes may appear much better value initially, many of them have life expectancies of around 15-20 years which is only a third of the typical life expectancy of mastic asphalt.

Another consideration is that while some modern waterproofing products may provide impressive results in laboratory tests, they may perhaps not perform so well when installed and exposed to the rigours of UK construction methods and wet weather conditions. For the roof the size of a football pitch, mastic asphalt could cost £40,000 less than other waterproofing products over the lifetime of the installation.

Compared to synthetic membranes, mastic asphalt stands out for lower embodied carbon due to efficient production and recyclability. And as there is no plastic content, this reduces the reliance on fossil fuel-derived materials. Lastly, mastic asphalt requires far less maintenance, leading to fewer repairs and lower material consumption over time.

Technical Resources

To assist the specification of mastic asphalt across various applications, the Mastic Asphalt Council offers a range of technical guides. These can be downloaded free of charge at https://masticasphaltcouncil.co.uk/technical-guides-new.

We also offer a free, no obligation technical information service to specifiers relating to the design of all types of mastic asphalt installation.

For technical assistance, contact us on:

 01273 242778  info@masticasphaltcouncil.co.uk