

# COLLACE QUARRY WARM MIX ASPHALT 2025

## Introduction

In an ongoing commitment by Tayside Contracts and our council partners of Angus, Dundee City and Perth and Kinross councils to consider how the services we provide impact the climate change agenda and the commitment to reduce our CO2 emissions to help move towards a net zero objective, we are pleased to advise the introduction of Warm Mix Asphalt materials ‘TayLow’ into the range of low carbon materials produced at Collace Quarry for more sustainable road surfacing.

## Background

Warm mix asphalt (WMA) was developed in Europe in the 1990’s in response to increased awareness of Climate Change, and in particular greenhouse gas emissions. Since then, WMA techniques have advanced and manufacture has gradually been accepted across Europe, as well as being established in the USA. In 2019 Warm Mix Asphalts were introduced into the Specification of Highway Works. Data sourced from the European Asphalt Pavement Association for 2019, showed that 72.00Mt of WMA was manufactured in the USA, 4.30Mt in France, 1.74Mt in Norway, and less than 1.00Mt in UK.

Research, combined with practical trials of WMA has shown that asphalt mixtures can be successfully manufactured and laid at temperatures of 20 to 40°C lower than hot mix asphalt (HMA). They also provide a number of site safety and productivity benefits, and no compromise on performance. This is achieved by the addition of an additive to the bitumen, either by metered in line dosage or pre blended at the bitumen refinery. The additive can be either organic which lowers bitumen viscosity or chemical which reduces friction at the bitumen/aggregate interface, making it possible to manufacture and lay asphalt at lower temperatures.

## Benefits of WMA

- Reduced greenhouse gas emissions due to reduced energy in the asphalt manufacturing process.**  
A reduction in CO2 emissions of between 5% to 15%, dependant on asphalt plant settings and other factors.  
Potential to reduce fume emissions by 70%.
- Improved site safety with reduced exposure to fumes and lower working temperatures for road maintenance workers**  
Potential to reduce fume emissions by 70% (European Asphalt Pavement Association data).
- Reduced expenditure on fuel of between 5% and 15%..**  
Potential £13k net savings on fuel (LPG), taking into account cost of additive\*.
- Reduced laying and compaction temperature making it possible to open roads to traffic sooner.**
- Increased workability of mix, giving extended fixed and mobile asphalt storage time.**

\*Based on a 30°C asphalt plant mixing temperature reduction and anticipated sales of suitable WMA materials.

It is the latest example of our commitment to using technical expertise to create more sustainable paving materials. Responding to the challenges faced by modern paving engineers, it is designed to help them complete more work in less time, keep busy roads moving and meet the highest standards of safety and sustainability.



## Implementation

Warm Mix Asphalt production shall commence in May 2025 with a phased approach. We will start with the dense base and binder courses, then during June 2025 all close graded asphalt concrete surface courses.

The introduction and use of this material has been discussed and agreed by all three constituent council partners. This demonstrates a commitment to the objectives of the Climate Change Act (Scotland) 2019, as well as internal commitments to development of an environmentally sustainable future.

## Key Points

- Mixing temperature reduced by 30°C
- WMA will be manufactured and laid in accordance with the Specification of Highway Works recently published guidance note; Clause 908TS. Permitted WMA mixtures are:
  - Dense base and binder course asphalt concrete with paving grade bitumen (recipe mixtures).
  - Close graded asphalt concrete surface course.
  - Dense base and binder course asphalt concrete (design mixtures).
  - EME2 base and binder course asphalt concrete.
  - Stone mastic asphalt (SMA) binder course and regulating course.
  - Thin surface course systems.
- HRA material will not form part of this e.g., HRA 30/14 surf 40/60, HRA 55/10 surf 40/60 des, HRA 50/20 bin/base 40/60 mixtures etc.
- Private customers will be notified and included within the scope of this exercise.
- WMA materials will be prefixed with (W) at the material description on the weighbridge ticket.

## Performance Monitoring and Data Acquisition

<p><b>Quarry</b></p> <p>Mixing temperature Ambient Temperature Despatch temperature Kg of LPG consumed per tonne of asphalt mixture Greenhouse gas emissions CO2 (calculated) Increased manufacturing cost vs reduced fuel cost.</p>
<p><b>Site</b></p> <p>Ambient temperature Delivery temperature Paver hopper discharge temperature Temperature behind paver screed Compaction temperature Workability (observation and comment) Hand laying (observation and comment).</p>
<p><b>Testing</b></p> <p>Bulk density Air voids content Stiffness Deformation resistance Texture depth Measurement of volatile organic compounds (VOC's)</p>