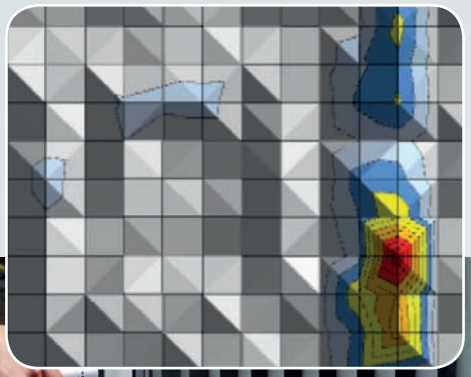
BAUDER



SERVICE

TECHNICAL DIAGNOSTIC FLAT ROOF SURVEYS

TECHNICAL ROOF DIAGNOSTICS

Pinpointing precise areas of water ingress on existing flat roofs

Technical roof diagnostics support and enhance our flat roof review survey by verifying the exact levels and locations of moisture within existing waterproofing systems.

The readings from the testing method give objective information about the true condition of a roof, eliminating conflicting opinions and advice so that sound decisions can be made on the roofing options.

We can provide two forms of non-destructive technical diagnostic testing to supplement our roof survey; thermographic imaging and moisture mapping. Thermographic imaging utilises an infrared thermal camera to identify areas of heat loss due to water present within the insulation, while moisture mapping interprets the levels of hydrogen, and therefore water, present within the roof materials being analysed via a neutron emitting meter gauge. The information acquired from the additional diagnostic report reveals the exact performance of the flat roof and allows for precise planning of any remedial roof works or maintenance required without conjecture.

The report identifies areas of dry and moisture impeded insulation so that a suitable recommendation can be made, ensuring that remedial work is only carried out on essential areas through partial or isolated removal of damaged roof areas rather than a full removal of the waterproofing system. The report also identifies if the waterproofing is sound enough to be overlaid entirely without damaging levels of water becoming trapped. This comprehensive analysis enables accurate costings to be put forward for budget certainty.

Benefits of a Supportive Technical Diagnostic Report

- Decisions for roof repair are based on accurate, scientific information rather than assumptions and opinions
- Precise roof areas are pinpointed for specific remedial action
- Detailed scope of works ensures that remedial work is only carried out on essential areas
- Saves money by eliminating unnecessary removal of existing waterproofing
- Gives cost certainty to the client

MOISTURE MAPPING

Moisture mapping gauges the thermalisation (slowing down) of emitted neutrons to detect hydrogen and therefore moisture content to a depth of 300mm and diameter of 250mm from the gauge base. Roofing materials also contain hydrogen, and so a background reading is established by analysing core samples taken from varying gauge reading locations (low-high) to determine how much of the thermalisation is due to trapped moisture.

Measurements are generally performed in a two metre grid pattern that is plotted on a scaled drawing of the roof. Once readings to all grid points have been taken, a histogram is created to help determine which values represent dry and wet areas.

Moisture mapping is suited for all roof structures, particularly those with multiple layers of insulation and previous waterproofing systems. The gauge will also detect moisture within certain decks or supporting structure in uninsulated roof situations.

Our diagnostic report plots precisely the roof's condition confirming the suitability of the existing build up to receive a waterproofing membrane overlay and identifying areas that need the insulation to be replaced beforehand.

Testing Method Key Features

- Multiple roof systems on a roof area, such as those having already been overlaid
- Multiple layers of insulation
- Analysis penetration up to 300mm
- Daytime readings taken
- All deck types
- All waterproofing systems and ballasted roofs

OUTLINE MOISTURE MAPPING REPORT

In total 561 gauge readings were taken, with readings ranging from 20-72 recorded.

Four core sample were cut; the first at a low point on the roof at grid reference **e7** where a gauge reading of 125 was recorded and the waterproofing system was found to contain saturated 20mm thickness cork insulation with the underlying first layer of 12mm fibreboard insulation being wet and the lower layer of fibreboard insulation being dry.

The second core sample was cut at low point grid reference **g15** where a gauge reading 34 was recorded and the varying waterproofing system components were all found to be dry.

The third core sample was cut at high point grid reference **f27** where a gauge reading 48 was recorded and the waterproofing system was found to contain damp 140mm thickness cork insulation with a layer of standing water under the cork. Due to the volume of water we could not cut through the underlying waterproofing membranes and insulation layers.

The forth core sample was cut at low-midpoint grid reference **d4** where a gauge reading 42 was recorded and the waterproofing system was found to contain damp 50mm thickness cork insulation with the underlying first layer of fibreboard being dry but in a powder format due to having previously been wet. The final layer of fibreboard insulation was found to be dry and in a good stable condition.

Analysis of Data Readings

Using the core sample results we have established that all readings 18-40 can be interpreted to show the waterproofing to contain very little or no moisture, readings with the higher readings being associated to changes in the waterproofing materials/thicknesses and not to moisture ingress.

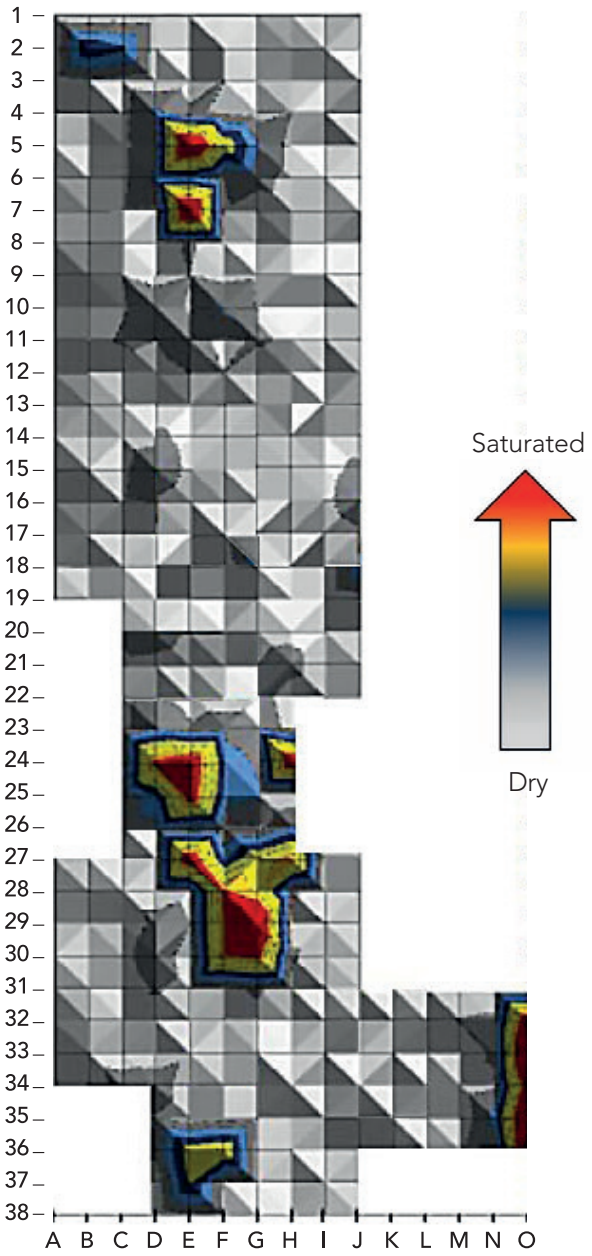
Readings 41 and above contain varying levels of moisture which rise in line with the increasing gauge readings.

Conclusion and Recommendations

The readings show that the existing built-up bituminous waterproofing system contains several localised areas of moisture where the cork and top 12mm fibreboard contain varying levels of moisture that should be removed and replaced with new dry products prior to installation of the proposed overlay system.

There is no requirement to remove the entire existing waterproofing.

Roof Moisture Plot



Client Hotline

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THERMOGRAPHIC IMAGING

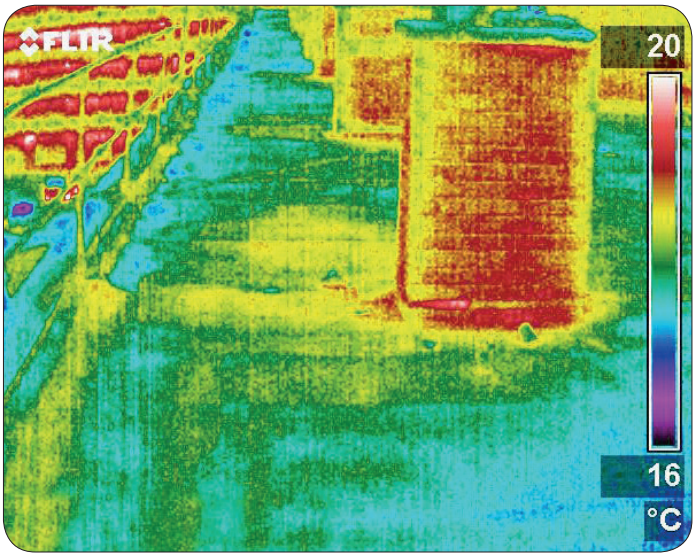
Thermographic roof surveys are conducted using an infrared camera to identify the locations of thermal irregularities and energy inefficiencies due to destructive water damage within the roof build up.

Thermographic testing must be performed at night-time when the roof surface has sufficiently cooled. The thermal image instantly shows temperature differences that verify wet and dry areas as moisture conducts heat faster than any parts that are dry, making roof leaks much easier to identify.

This diagnostic method is best suited to situations where only a single layer of insulation is between the vapour control layer and the waterproofing membrane.

Our analytical report includes visual evidence of the roof's condition and also quantifies the building's energy loss, so that we can help the client improve their roof's thermal efficiency.

Daytime observation of a roof area at Shaftesbury Court with no apparent signs of water ingress.



Night-time thermographic image of the same roof area at Shaftesbury, where the yellow parts on the roof show heat loss and damaged insulation because of water ingress.

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