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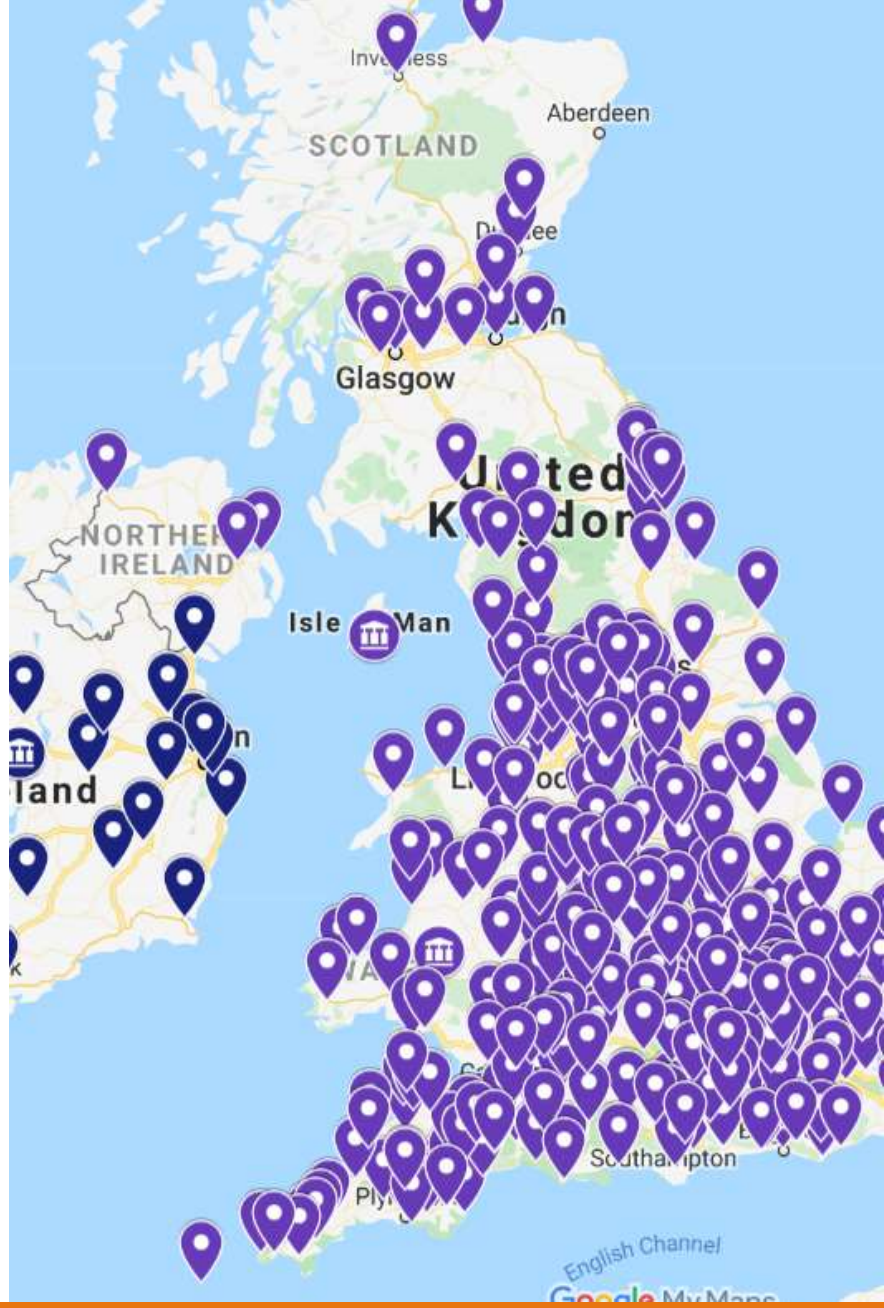
Looking Up

Identifying energy and carbon savings in flat roofs

Decarbonisation & net-zero

- COP26
- 68% reduction in Greenhouse Gas (GHG) emissions by 2030
- Future Homes standard/Future buildings standard
- Heat in building strategy
- ‘100% green electricity’ by 2035
- Approximately 43% of UKs energy usage is in buildings



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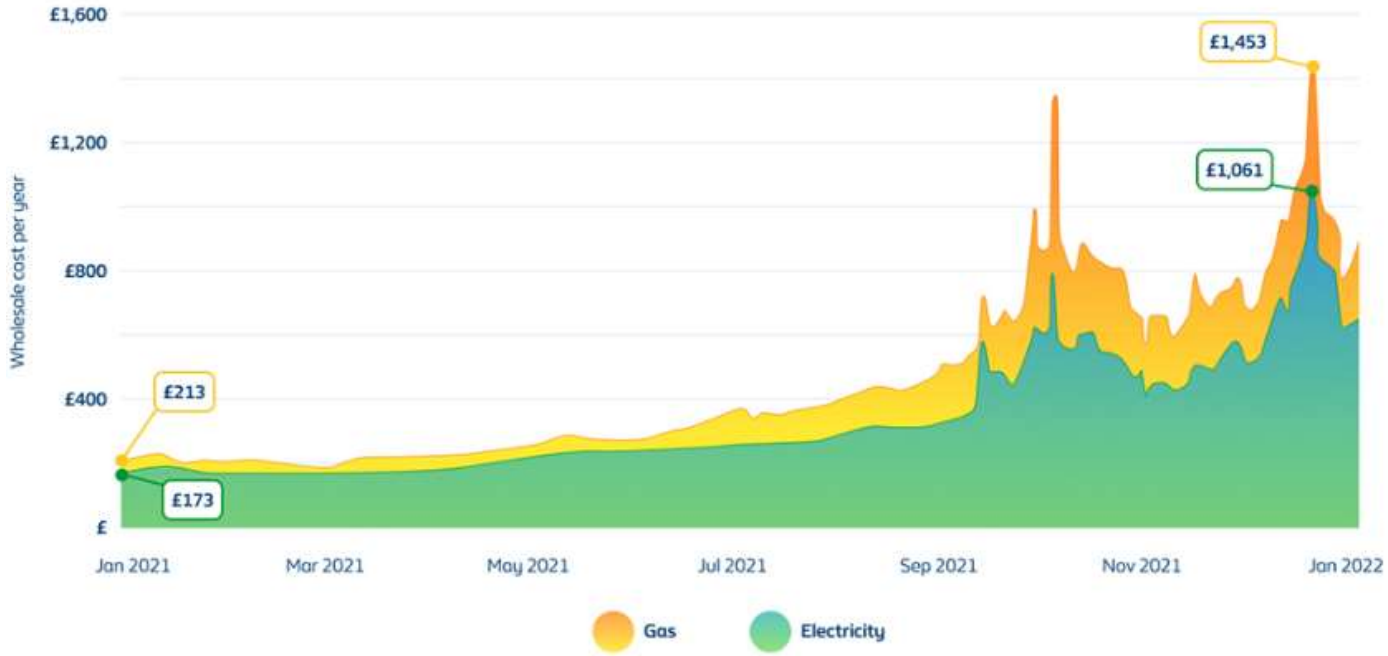
- Wholesale energy prices ‘up 250% since January’



CONSIDERING CO_2 AND ENERGY LOSS

A fabric first approach?

Increasingly important to consider how we can reduce CO_2 emissions and energy costs to heat and cool buildings

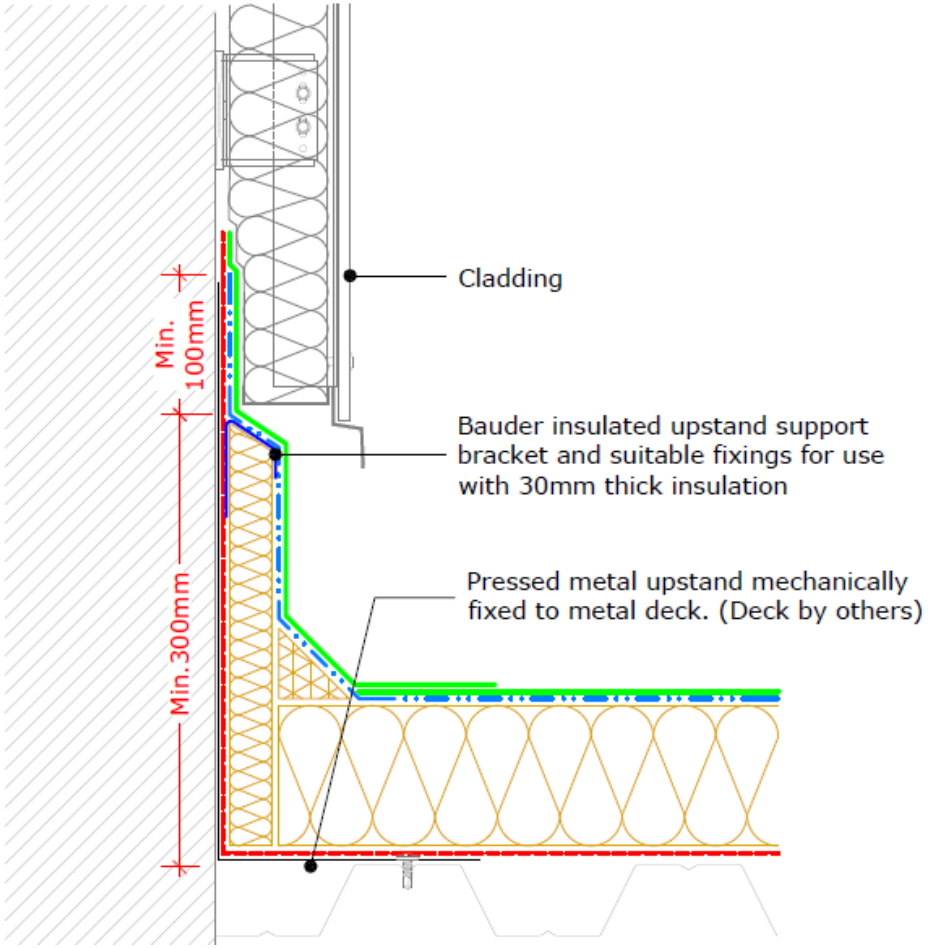
The refurbishment of poorly insulated flat roofs can have a considerable benefit in terms of energy savings and so reduce CO^2 emissions.

By utilising the roof area to house a solar PV array the benefits are even more significant.

First, you need to know how your existing roof is performing – Here's how you can find out.

TYPICAL WARM ROOF DESIGN

Verifying true thermal performance



AVCL – Forms a secondary waterproofing

Water ingress contained in insulation

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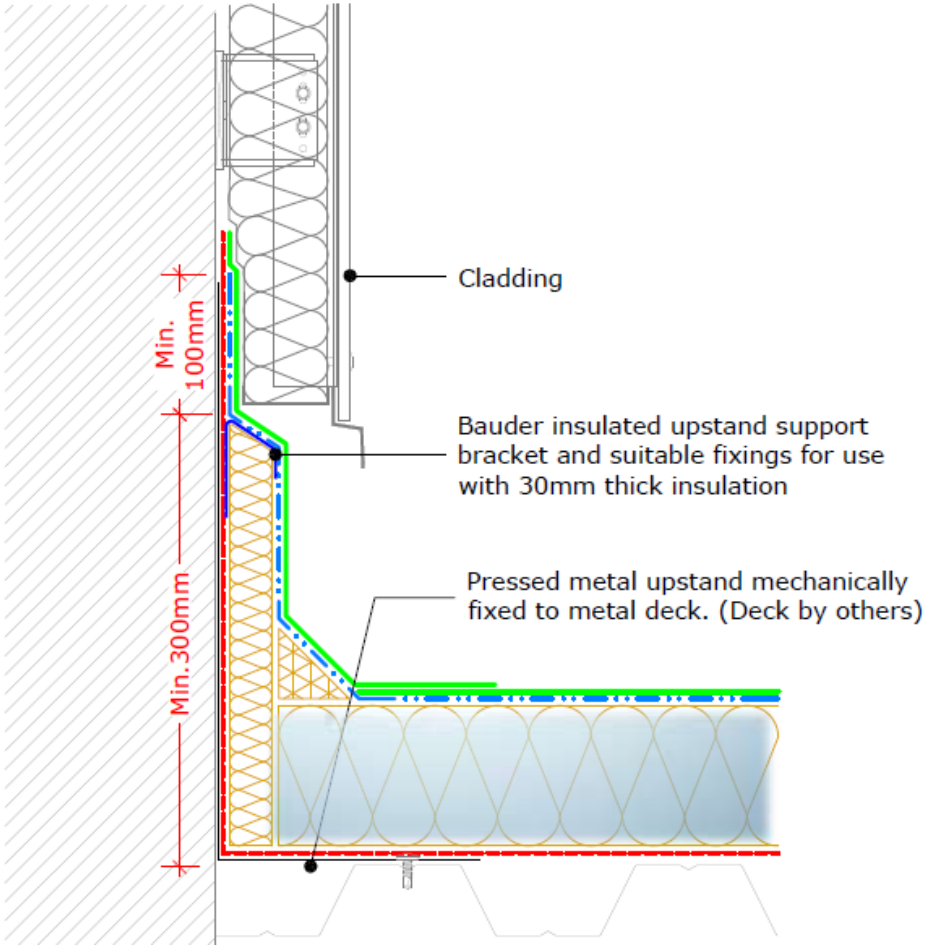

Insulation slowly absorbs water

Roof may not show any signs of a defect

How can Bauder help?

Combined, value added approach for refurbishment clients

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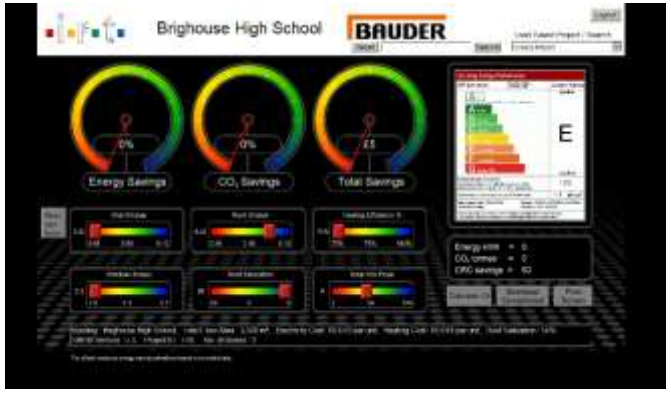

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= Verified carbon and financial savings for every roof refurbishment project

PRINCIPLES OF THE SERVICE OFFER

What are the objectives?

REGARDING THE CURRENT ROOF	
TO UNDERSTAND:	TO PROVIDE:
Condition of the waterproofing	Bespoke data on potential savings
Thermal performance	A project specification
Energy efficiency	Correct roofing solution (with PV)

TECHNOLOGIES BEHIND THE SERVICE

How does the data come together?

MOISTURE GAUGE:

Radioactive source

Measures moisture levels

Roof covering 0 mm deep

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ENERGY LOSS SOFTWARE:

Uses data from moisture map

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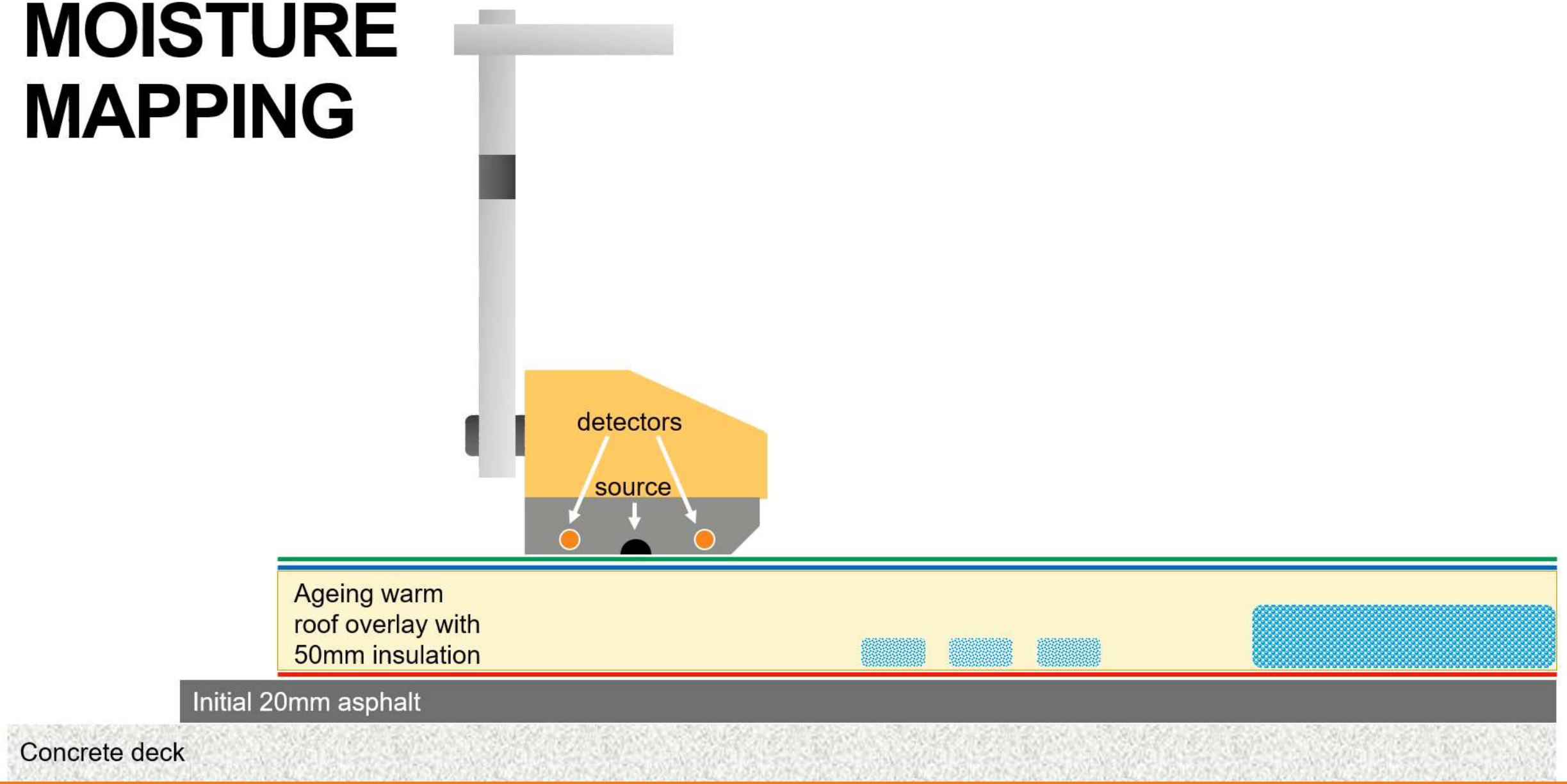
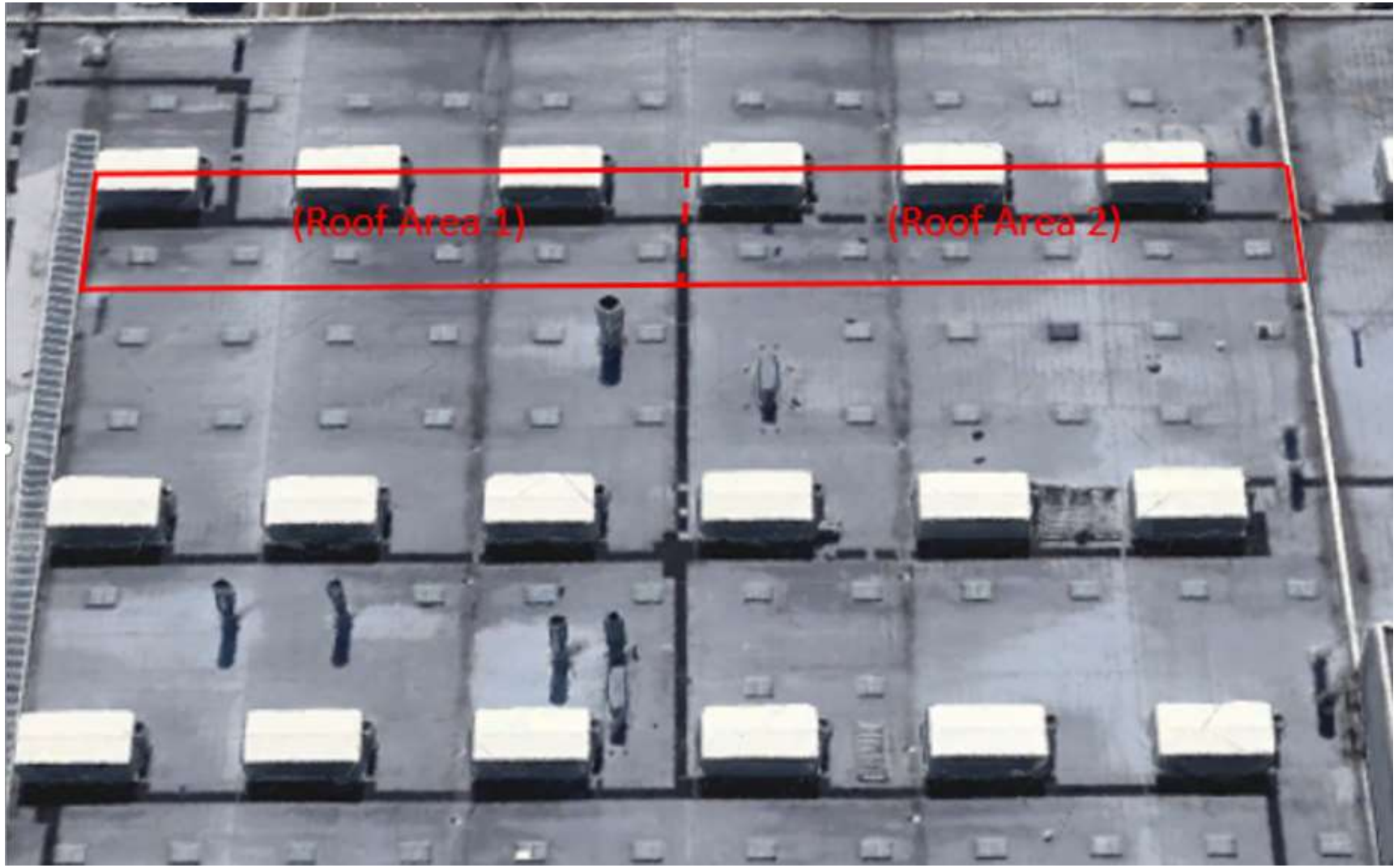
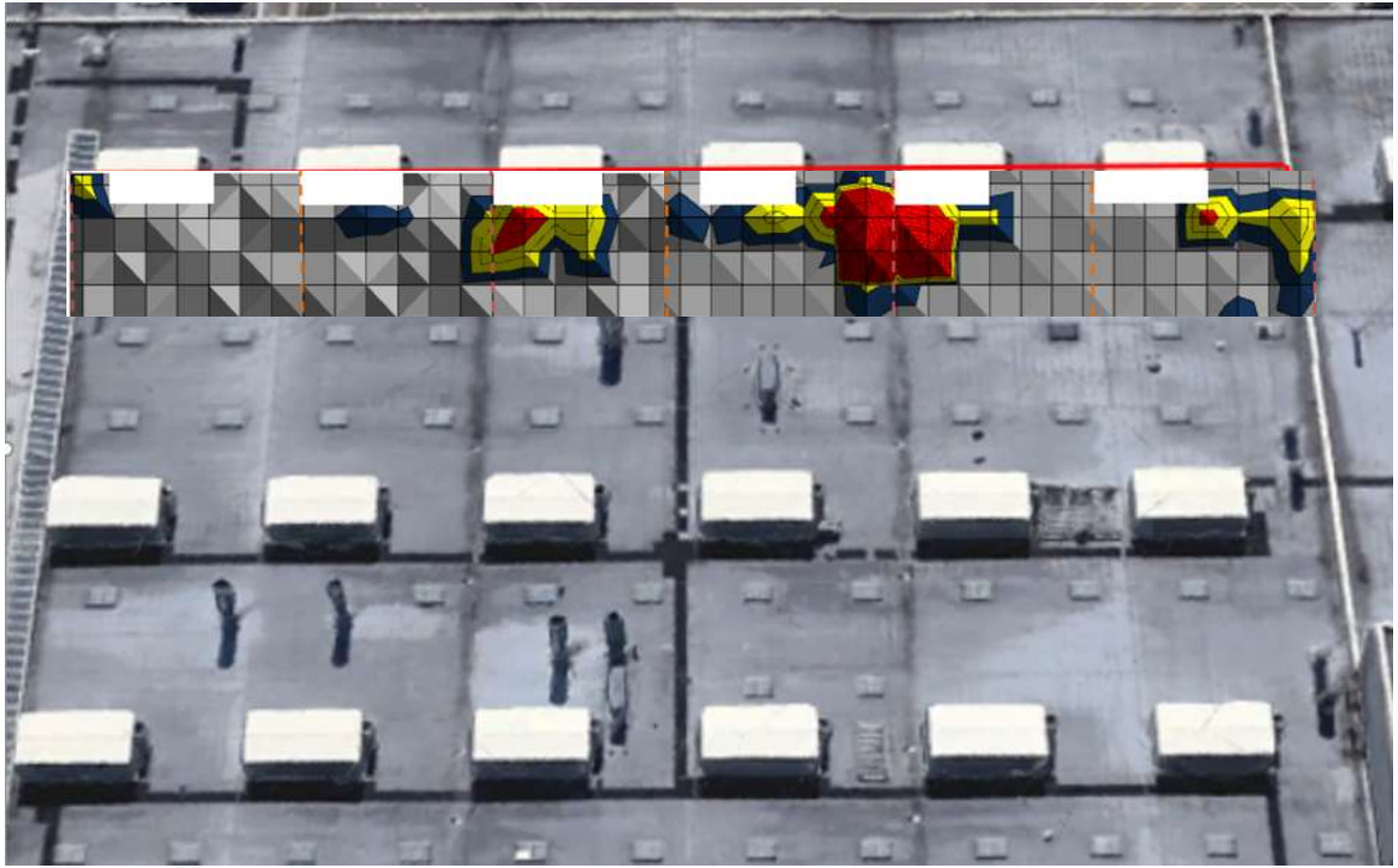
MOISTURE MAPPING

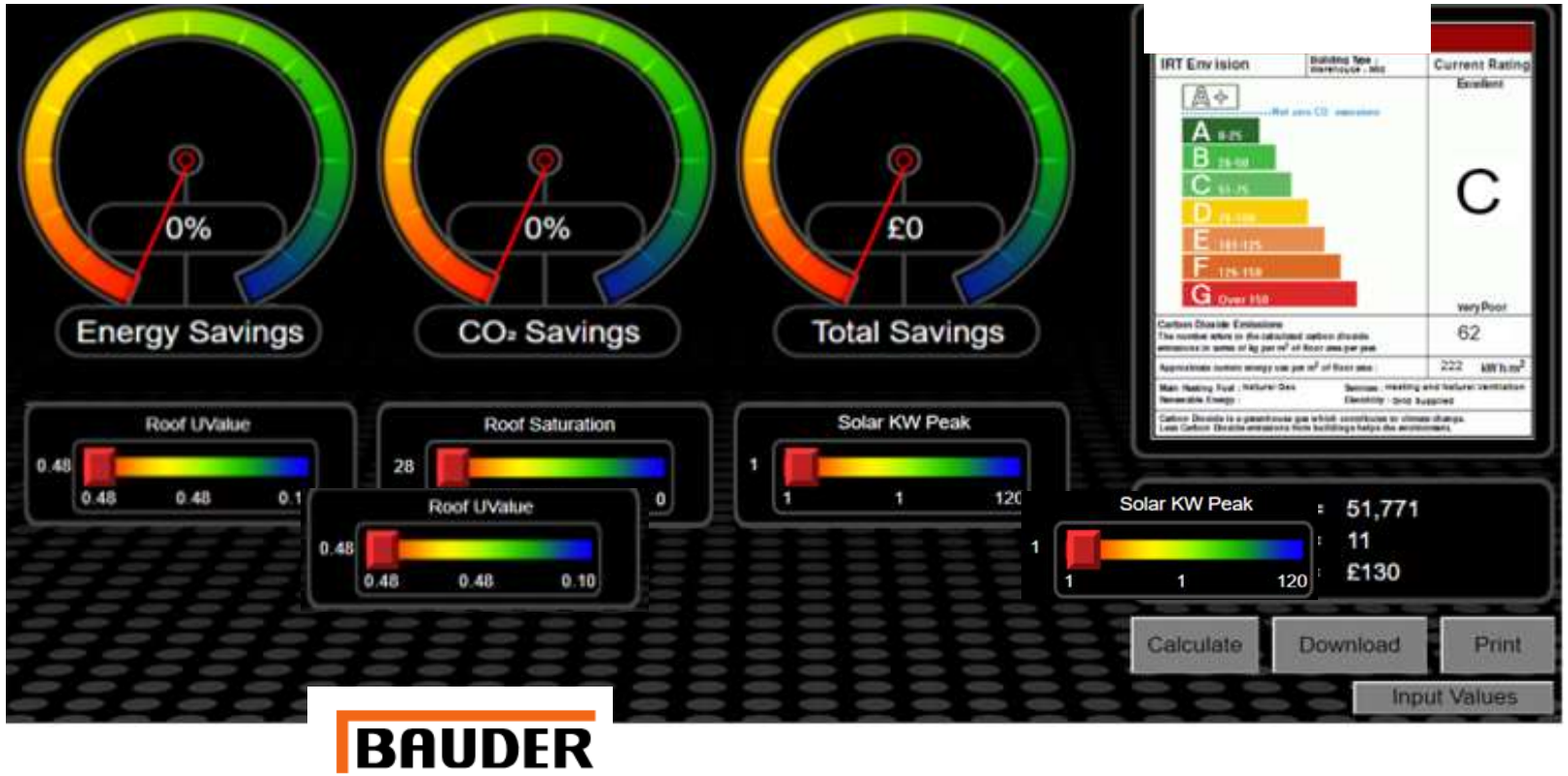



(Roof Area 1)
(Roof Area 2)



Carbondash

Calculating the benefit of additional insulation



- Provides:
  - Energy savings
  - CO_2 saving
  - Financial saving
- SBEM based data
- Provides EPC projection

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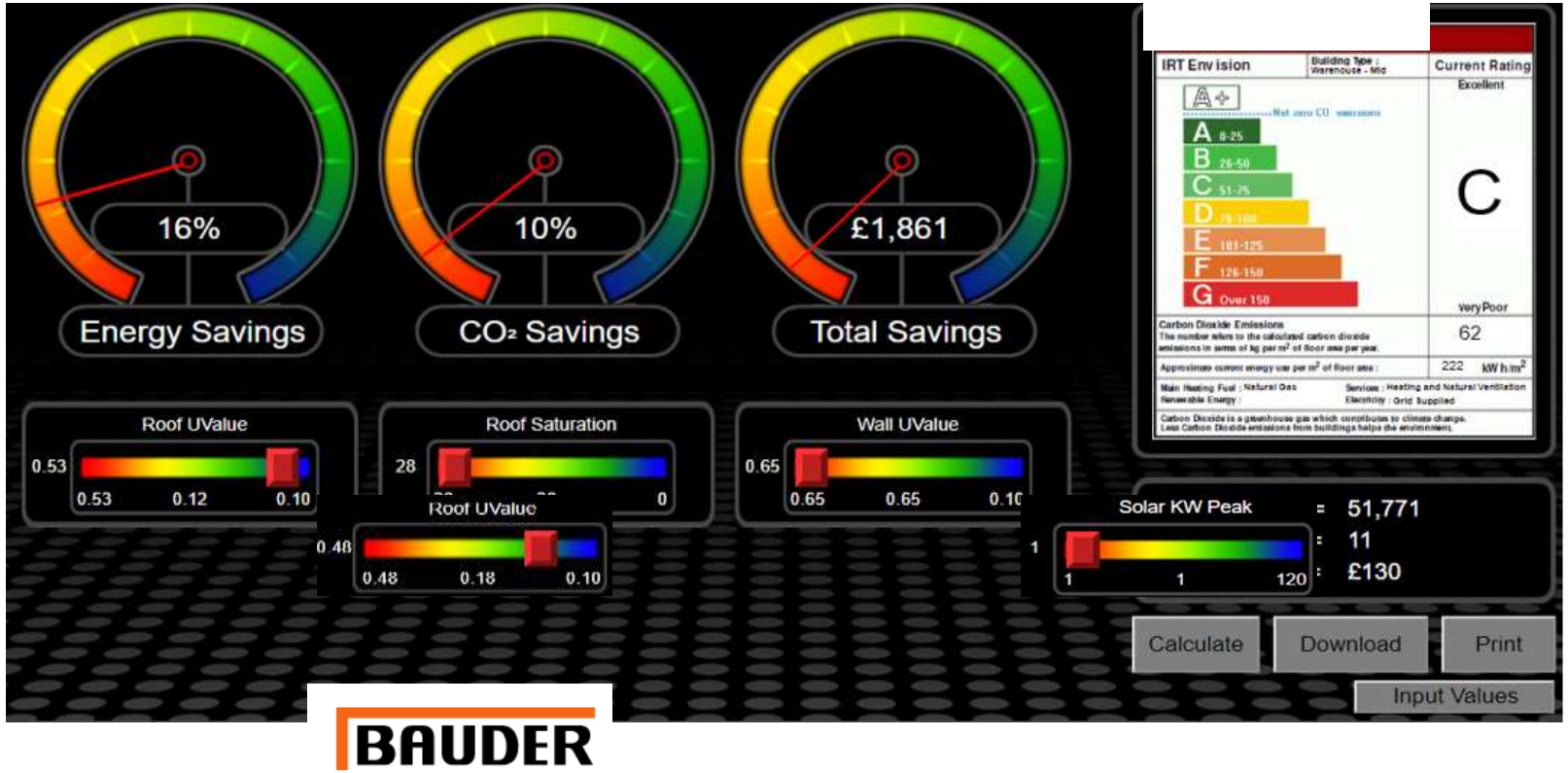

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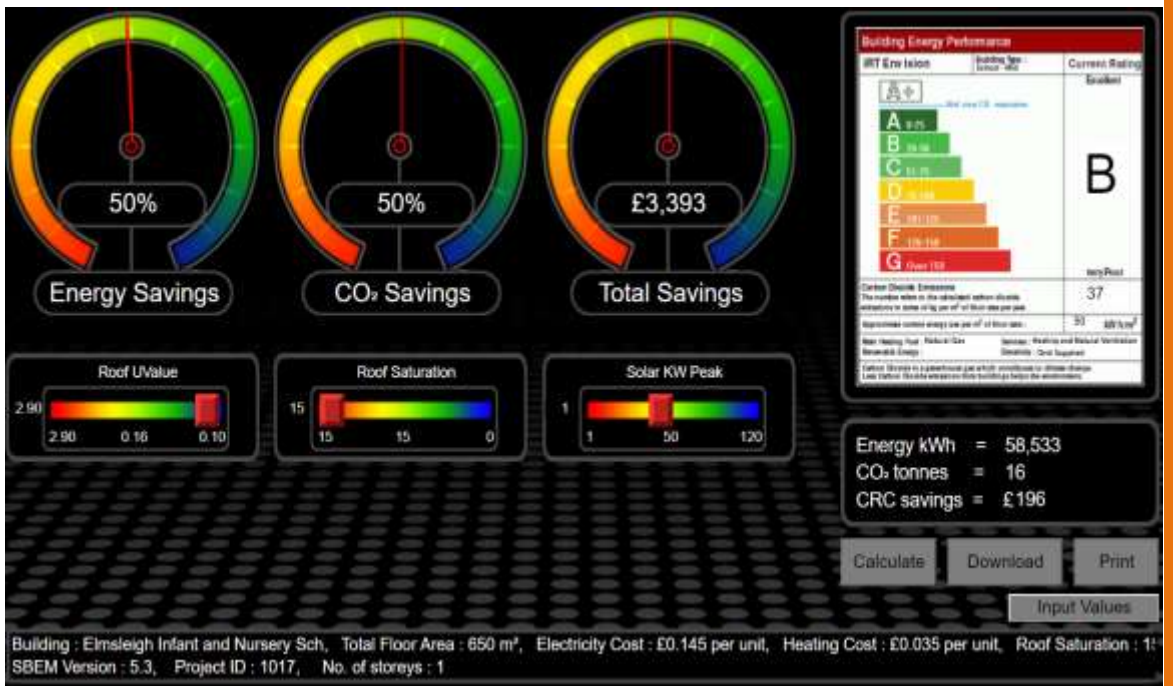
CARBON DASHBOARD

Elmsleigh Infant School

Community funded solar PV array

- 50kWp
- Zero capital outlay
- Zero maintenance
- Financial savings in yr 1 = £1,770
- Total saving in yr 1 (insulation + solar PV) = £3,393
- 50% Carbon saving



SOLAR Photovoltaic (PV) OVERVIEW

Roof mounted PV Array

DC side isolation switch

Inverter

AC side isolation switch

Main fusebox

Meter

AC mains Supply

PV Generation Meter

Power to Equipment

SMART, FUTURE-PROOF, DECENTRALIZED ENERGY SYSTEMS

Smart Grid

Virtual Power Plant

Behind the Meter Services

Fleet Management

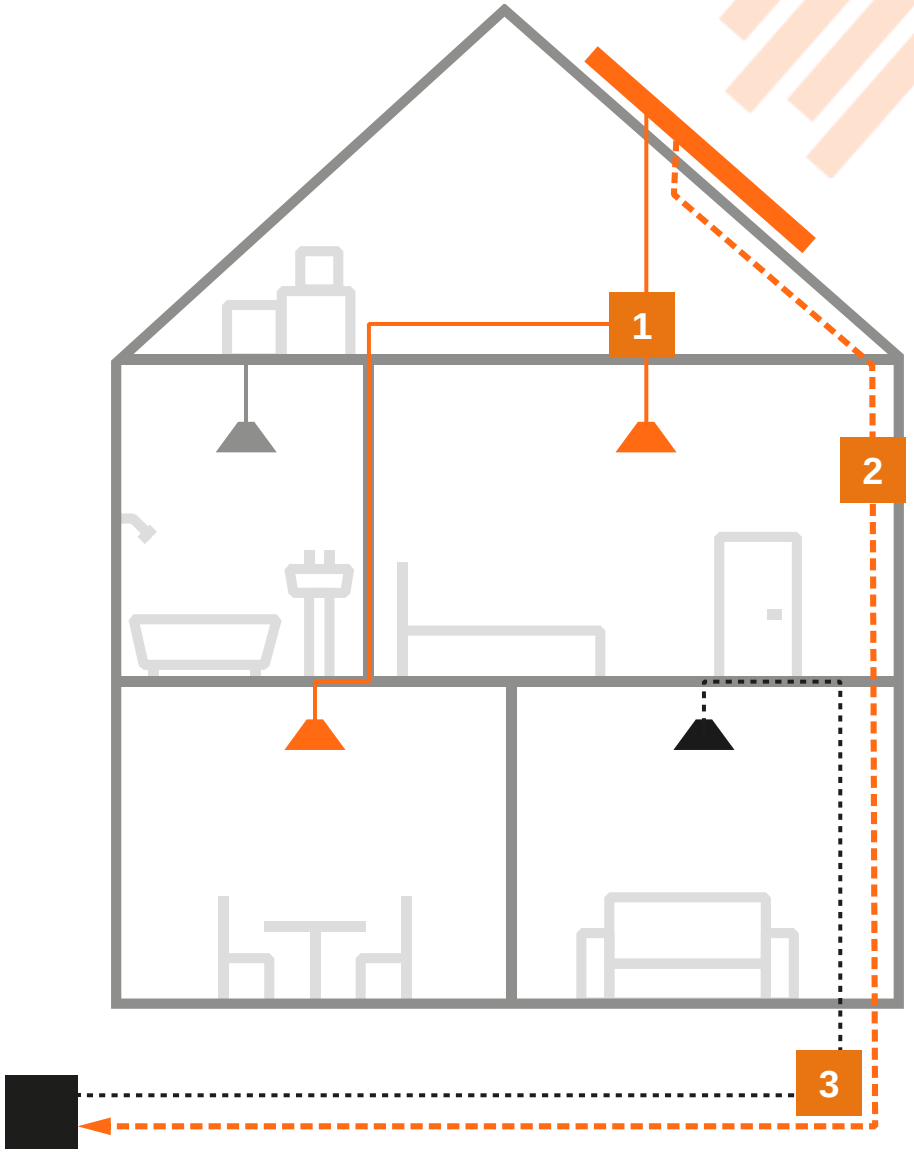
SOLAR PV

The business case

1. **This is free**

2. **Get paid for what you export (hopefully)**

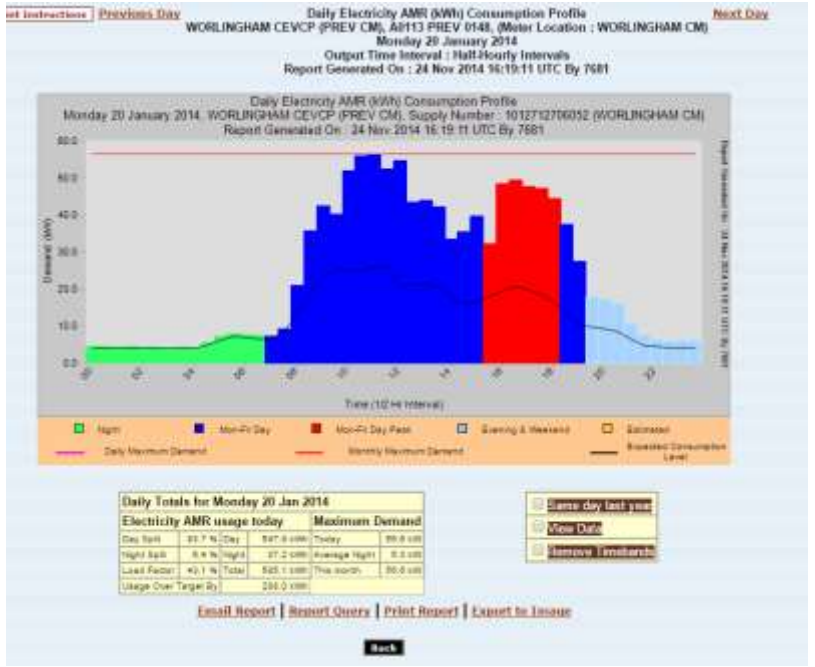
3. **Use less from the grid**



PROJECTED ROI

Typical secondary school

- 150kWp solar array
- 80% self consumption
- Paying 22.5p/kWh for electricity
- Savings year 1 - £23,800
- 20 year savings - £717,000
- 5 year payback



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DESIGN CONSIDERATIONS

The roof

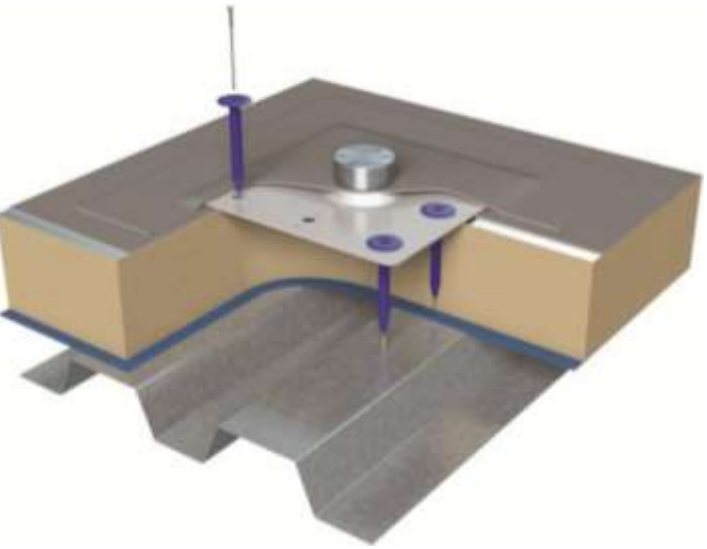
Existing roof conditions

Membrane durability

Structural stability

ANCHORING METHOD

MECHANICAL
Penetrating fixings



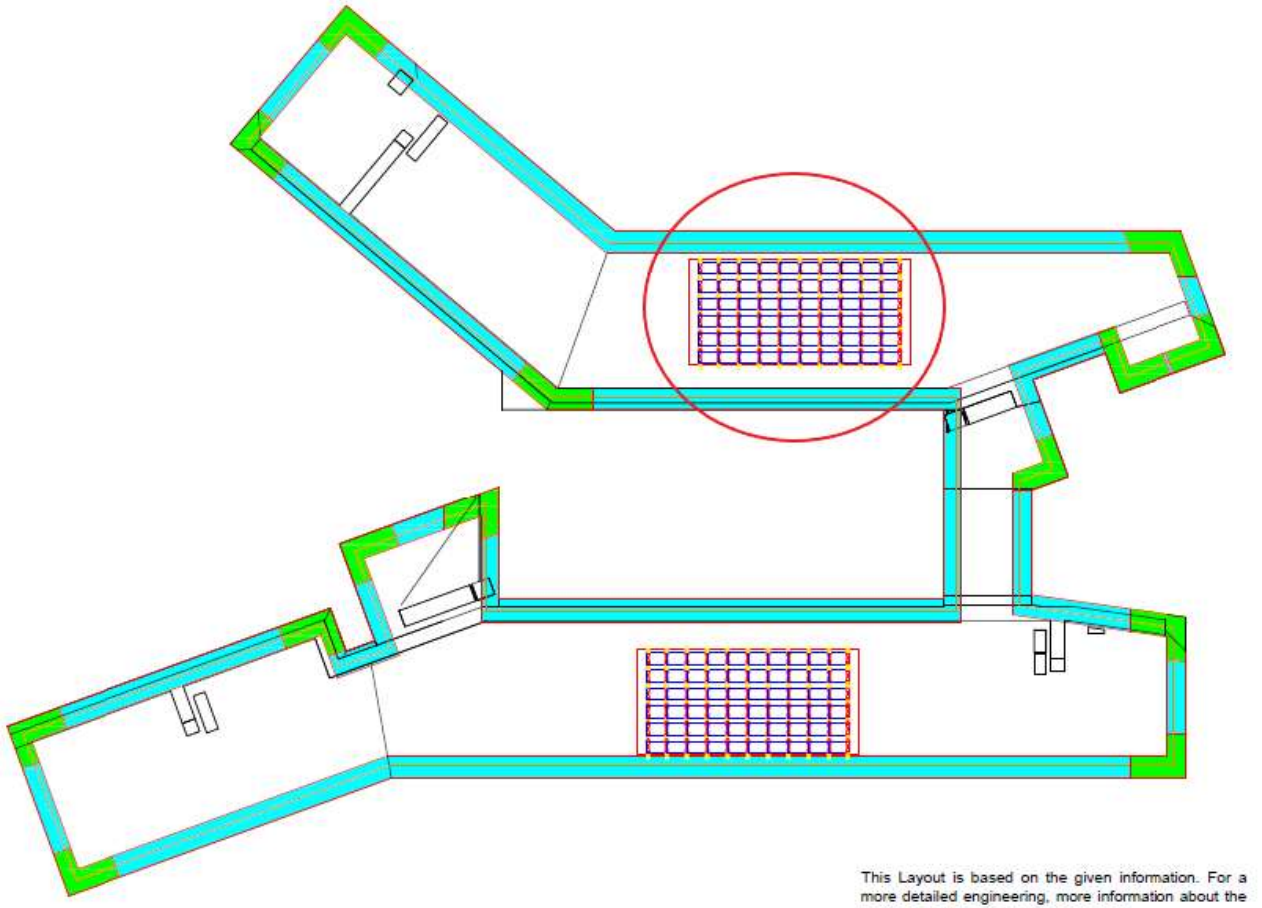
Any penetration is a risk

MECHANICAL
Non- penetrating

BALLASTED
Additional weight loading

SHADING ITEMS

Maximising output



This Layout is based on the given information. For a more detailed engineering, more information about the roof and nearby objects are necessary.

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70 Landseer Road
Ipswich, IP3 0DH

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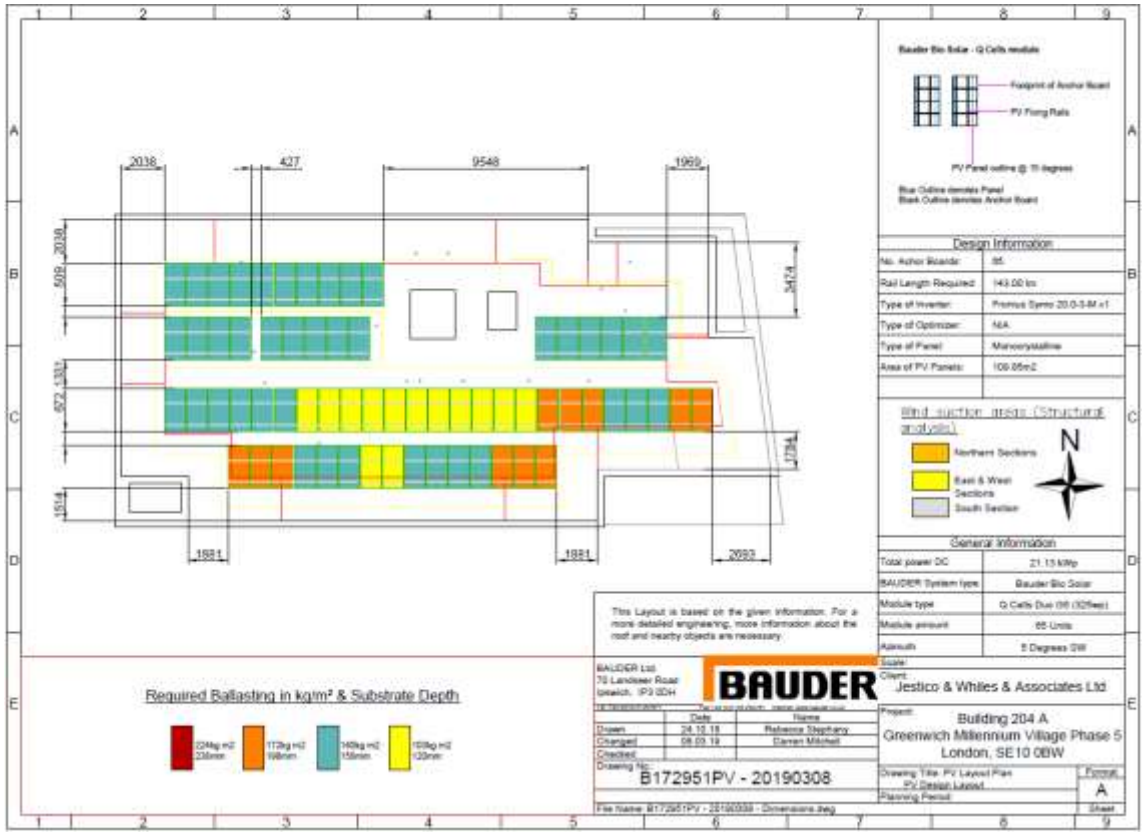
DESIGN CONSIDERATIONS

Location

PLANNING CONDITIONS

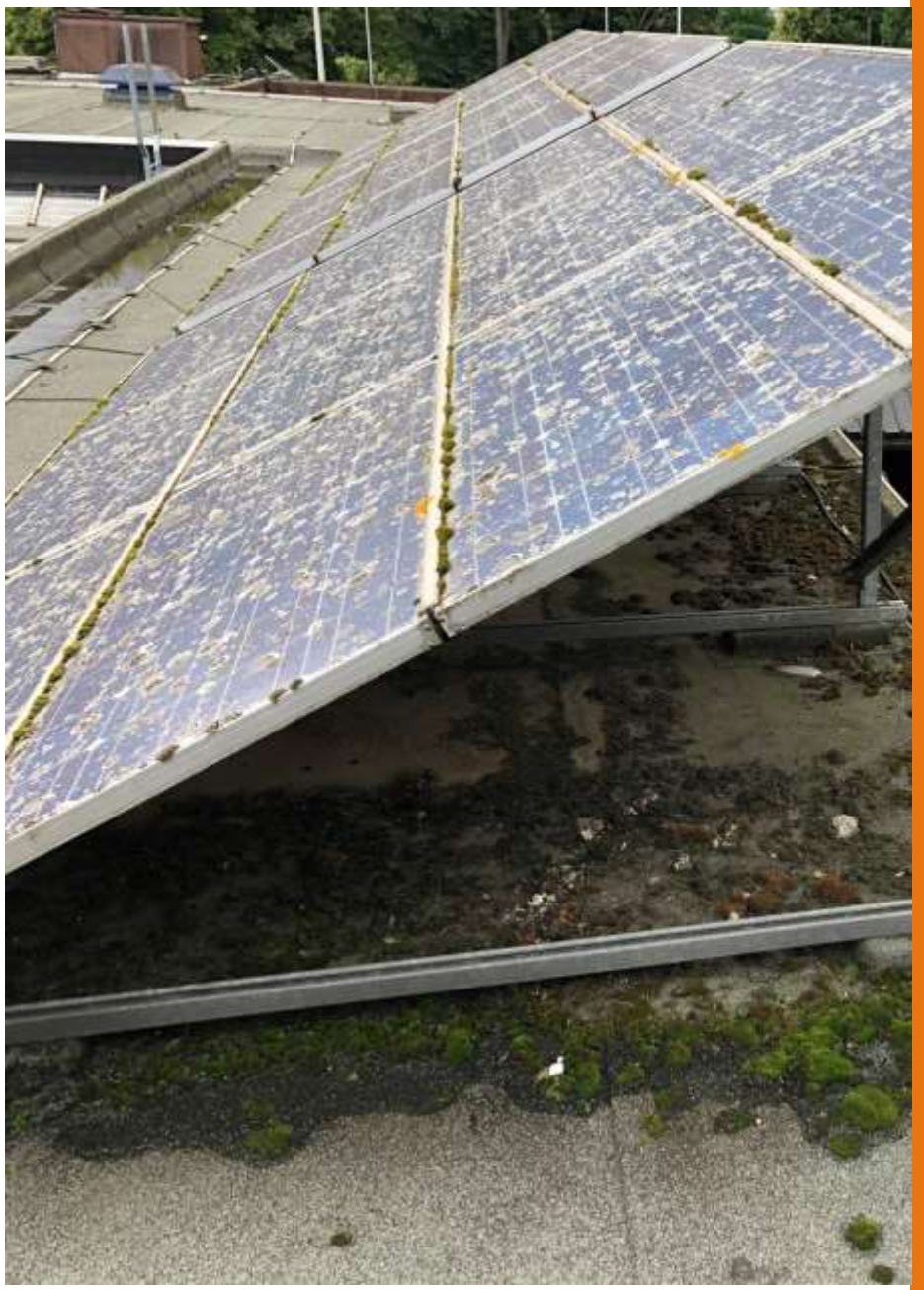
WIND LOAD IMPACT

VISIBILITY & UNWANTED ACCESS



MAINTENANCE

- Cleaning of modules
- Inspection of electrical system
- Inspection of mounting system and fixings
- Audit energy production
- Achieve maximum performance.



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9 – 12.5Kg/m^2

Zero penetrations

Quick Installation

340Wp – 460Wp

UNIVERSITY OF WEST ENGLAND

1,713 BauderSOLAR PV modules

12,000 Sq m area for PV, 12Kg/m²

402 Megawatt hours

Single ply waterproofing system

Generates 50% of building's energy

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Roof refurbishment and retrofit PV array

Essex County Council

11 FREEBOURNES ROAD

- 5200 m² bitumen membrane system
- 588 modules generate 134.7MWh/yr
- Weight load restrictions
- Single source supply
- All-inclusive guarantee

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BIOSOLAR

Combining biodiverse roofs with PV

Water attenuation, biodiversity habitat and renewable energy

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Funding:

Various policies currently in place including:

- PSDS - https://www.gov.uk/government/collections/public-sector-decarbonisation-scheme
- SHDF - https://www.gov.uk/government/publications/social-housing-decarbonisation-fund/social-housing-decarbonisation-fund-questions-and-answers

- Solar specific:
  - Schools energy coop
  - Solar for schools
  - Eden sustainable

YOUR QUESTIONS?