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Roof Survey

**Report**

The Roman Baths

Stall Street, BATH

BA1 1LZ, United Kingdom

17 December 2024

Project Reference: B246069/1

**PREPARED FOR:**

**PREPARED BY:**

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# Introduction

Further to our site inspection we have prepared the following survey report based on the current condition of the existing roof/s. This survey report is based on our visual inspection of the roof/s together with our exploratory core test samples. It should be noted that core test samples are taken to identify the existing roof construction to deck level and to provide an indication of the roof condition. Due to the limited number of core samples that can be practically taken on a roof, Bauder Ltd cannot be held responsible for any changes in roof build-up in areas where core samples have not been taken.

## Description of Building and Weather Conditions

Building use – Public  
Height in Storeys: 1  
  
The weather conditions at the time of our survey inspection were dry and overcast  
The Roof surfaces at the time of our survey were Mainly dry

## Roof Access

Roof access was gained internally through an opening window.

## Confirmation of Client brief

To carry out an evaluation and produce a condition report for the flat roof areas concerned, together with specification proposals for upgrading the thermal performance and renewing the waterproofing system.

## Roof Plan

### Roof Area 1, Roof Area 2

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| Any measurements displayed on the map above are approximated and are therefore not to be used in tenders. |

# Existing Roof Construction

## Core Sample Analysis and Moisture Readings

Core samples are taken as a method of confirming the existing deck and waterproofing system construction and provide indicative feedback regarding general condition. Please note that the findings are representative only of the particular location tested and this is used to give general guidance as to the likely overall condition and deck construction.  
  
Moisture reading tests are used to indicate the percentage of moisture present within insulation and this can be helpful in establishing if levels are abnormal, especially if the sample is not found to be totally dry or completely saturated.

### Roof Area 1

|  |  |
| --- | --- |
| **No. of core samples taken:** | 5 |
| **Construction Type:** | Warm Roof |
| **Surfacing:** | Stone Chippings |
| **Waterproofing:** | BS747 Built-up bituminous membrane system |
| **Insulation:** | Rigid PUR/ PIR board |
| **Vapour Control:** | Bituminous membrane vapour control layer |
| **Roof Deck:** | Timber boarding |
| **Condition of core sample:** | Insulation is wet. |

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| --- | --- |
|  |  |
| Core samples showing existing build up | Core samples showing existing build up |
|  |  |
| Moisture readings showing wet insulation | Moisture readings showing wet insulation |
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| Core samples sealed on completion of investigation |

### Roof Area 2

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| --- | --- |
| **No. of core samples taken:** | 2 |
| **Construction Type:** | Warm Roof |
| **Surfacing:** | Stone Chippings |
| **Waterproofing:** | BS747 Built-up bituminous membrane system |
| **Insulation:** | Expanded polystyrene |
| **Vapour Control:** | Bituminous membrane vapour control layer |
| **Roof Deck:** | Woodwool slab |
| **Condition of core sample:** | Insulation is damp. |

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| Core samples sealed following investigation |

# Issues and Considerations

## Roof Area 1

### Decks

The decking is believed to be in a good condition and of a suitable construction type to be reused as part of the roof refurbishment.

### Existing Waterproofing

The existing waterproofing system is constructed as a warm roof, comprising built-up bituminous membranes incorporating insulation and a vapour control layer, installed onto the roof deck.

The condition of the existing waterproofing is extremely poor and is worthy of concern. There is extensive evidence of water ingress, due to advanced deterioration. As such, the existing system is beyond salvage and should be removed and replaced, using this opportunity to thermally upgrade the replacement system to comply with current Building Regulations.

This waterproofing system is showing all the typical defects consistent with a covering of this age including; surface oxidisation, cracks, splits, blisters, rucks and signs of repair.

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| Existing waterproofing is aged and worn. Areas also where laps are detached and inadequately bonded | Existing waterproofing is aged and worn. Areas also where laps are detached and inadequately bonded |
|  |  |
| Cable penetrations through waterproofing upstands | Cable penetrations through waterproofing upstands |
|  |
| The existing covering is past end of serviceable life |

There is evidence of water ingress that has contaminated and degraded the existing insulation. This will impact upon the thermal performance of the system and potentially the resistance to wind uplift if the adhesion between the waterproofing and insulation components have become impaired.

In accordance with BS6229:2018, Building regulations and Energy Conservation Standards for England and Wales roofs should be “designed and constructed so that thermal transmittance does not exceed 0.35W/m2K at any point.” The thermal performance of the existing roof build-up is poor and falls below the above standards.

One of the risks associated with inadequate levels of insulation is the potential for condensation to form within the structure or waterproofing system during periods of climatic extreme. This roof would therefore benefit from being thermally upgraded in line with current standards. Due to the Grade 1 listing it will not possible to insulate to current regs without altering the building fabric and aesthetics

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| Histogram following moisture mapping survey highlighting areas of wet insulation |

### Falls

BS6229:2018, the relevant code of practice for continuously supported flexible membrane coverings states all flat roof surfaces (including gutter beds) should be designed to ensure a finished fall of 1:80 is achieved.

The existing falls have been created within the roof structure during construction, they are equal to or greater than 1:80 and are considered adequate within the recommendations of BS6229:2018.

### Drainage

In combination with the roof falls, the current drainage system is considered adequate and rainwater disposal is well managed.

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| The roof drains to internal outlets via gutters formed around the roof perimeter | The roof drains to internal outlets via gutters formed around the roof perimeter |
|  |  |
| The roof drains to internal outlets via gutters formed around the roof perimeter | The roof drains to internal outlets via gutters formed around the roof perimeter |

### Upstands and Details

**Requirements for waterproofing at upstands and details**

Codes of Practice (BS 8217: 2005) dictate that the minimum height for waterproofing upstand detailing is 150 mm, taken from the finished surface. Perimeter kerbs should be a minimum height of 50 mm above the finished surface and detailed with a welted drip detail or edge trim.  
  
There should be no mechanical penetrations to kerb waterproofing or need for secondary weathering. Kerbs that are weathered with mechanically fixed metal capping or concrete copings are categorised as ‘abutment upstands’ and must comply with the minimum height requirement of 150 mm.

This minimum height rule applies equally to upstands to roof lights, pipes, vents and door and window thresholds.

Waterproofed upstand detailing is usually weathered with lead or metal counter-flashings, metal capping and cladding. Termination bars should only be used when fixing to concrete abutments, where no provision exists for other forms of secondary weathering.

**Waterproofing height to Stonework upstand requires increasing**To comply with codes of practice the waterproofing should be dressed up the stonework upstand to a minimum height of 150mm above the new finished roof level. This will impact on the position of any counter-flashings which also need to be raised accordingly. Due the current height of the perimeter balustrade it will not be possible to achieve a compliant upstand of a minimum 150mm

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| Upstands to balustrade | Upstands to balustrade |

**Waterproofing beneath rendered upstand requires increasing.**To comply with codes of practice the waterproofing should be dressed up the upstand to a minimum height of 150mm above the new finished roof level. This will require cutting back the render to the nearest horizontal mortar joint to achieve a minimum 150mm upstand. New counter-flashing are then to be installed and the render made good.

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| Upstands to rendered wall abutment | Upstands to rendered wall abutment |
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| Upstands to rendered wall abutment |

**Defective counter-flashings**The existing counter-flashings are generally in poor condition and should be replaced. The counter-flashing will need to be repositioned should the upstand height increase as a consequence of replacing the waterproofing system and including additional insulation.

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| Defective lead counter flashings | Defective lead counter flashings |

**Removing existing extractor vents to increase the kerb height**The existing powered extractor vents need to be removed to allow the kerb to be raised to provide the required minimum height.

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| Existing Extractor vents | Existing Extractor vents |

### Rooflights

The current rooflights are proprietary plastic glazed units. These fall below current thermal and light transmittance standards and the performance will continue to decrease with age. The service life of these rooflights is not compatible with the service life of the new waterproofing system and for these reasons we propose that they are replaced. Please be aware that these units may contain asbestos in the internal linings.

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| Existing Roof Lights | Existing Roof Lights |

### Plant

Existing methods of allowing pipes and cables to penetrate through roof are inadequate. The current detail cannot be maintained as part of the roof refurbishment. The existing pipes and cables will require disconnection and a new proprietary cable penetration sleeve installed.

The existing items of M&E equipment are located on or very close to the surface of the waterproofing. The proximity of the equipment to the waterproofing will prevent access to re-waterproof. To allow the refurbishment to take place the equipment will require temporary disconnection and be set aside for later reinstatement.

## Roof Area 2

### Decks

The existing deck is woodwool, these slabs are made up of randomly distributed shredded wood fibres, petrified by chemical impregnation and bound together with cement and compressed into slabs. If the panels are not left plain or unfinished a factory applied finish of cement based slurry or bituminous layer is installed to provide a surface upon which to apply the roof finishes.

From as far as we are able to determine, the deck appears to be in an adequate condition. However if the existing waterproofing is stripped from the woodwool deck the structural integrity of the deck can be compromised. Woodwool decking is no longer manufactured which limits the options available if localised replacement is required.

Note - an adequate provisional sum should be set aside to cover for any unforeseen issues related to the removal of the existing waterproof covering that may necessitate localised repairs to the existing deck.

### Existing Waterproofing

The existing waterproofing system is constructed as a warm roof, comprising built-up bituminous membranes incorporating insulation and a vapour control layer, installed onto the roof deck.

The condition of the existing waterproofing is extremely poor and is worthy of concern. There is extensive evidence of water ingress, due to advanced deterioration. As such, the existing system is beyond salvage and should be removed and replaced, using this opportunity to thermally upgrade the replacement system to comply with current Building Regulations.

This waterproofing system is showing all the typical defects consistent with a covering of this age including; surface oxidisation, cracks, splits, blisters, rucks and signs of repair.

In accordance with BS6229:2018, Building regulations and Energy Conservation Standards for England and Wales roofs should be “designed and constructed so that thermal transmittance does not exceed 0.35W/m2K at any point.” The thermal performance of the existing roof build-up is poor and falls below the above standards.

One of the risks associated with inadequate levels of insulation is the potential for condensation to form within the structure or waterproofing system during periods of climatic extreme. This roof would therefore benefit from being thermally upgraded in line with current standards.

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| Defective waterproofing | Aged and defective waterproofing |
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| Poor detailing to upstands | Detached detailing to upstands |

### Falls

BS6229:2018, the relevant code of practice for continuously supported flexible membrane coverings states all flat roof surfaces (including gutter beds) should be designed to ensure a finished fall of 1:80 is achieved.

The existing falls have been created within the roof structure during construction, they are equal to or greater than 1:80 and are considered adequate within the recommendations of BS6229:2018.

### Drainage

In combination with the roof falls, the current drainage system is considered adequate and rainwater disposal is well managed.

Lead sleeve outlets exist on this roof, inserted into the pipework, but these units have no form of proprietary seal. Consequently, there will be a potential risk of water being able to enter the roof structure below the waterproofing system should these downpipes ever become blocked.

Lead sleeve outlets do not offer particularly good drainage performance as they have no bowl to maximise performance and the water flow rate is limited as a result. A surrounding sump detail can help to improve flow rate performance. If these items can be replaced by a proprietary outlet with a seal, this is strongly recommended.

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| Existing lead outlets |

### Upstands and Details

**Requirements for waterproofing at upstands and details**

Codes of Practice (BS 8217: 2005) dictate that the minimum height for waterproofing upstand detailing is 150 mm, taken from the finished surface. Perimeter kerbs should be a minimum height of 50 mm above the finished surface and detailed with a welted drip detail or edge trim.  
  
There should be no mechanical penetrations to kerb waterproofing or need for secondary weathering. Kerbs that are weathered with mechanically fixed metal capping or concrete copings are categorised as ‘abutment upstands’ and must comply with the minimum height requirement of 150 mm.

This minimum height rule applies equally to upstands to roof lights, pipes, vents and door and window thresholds.

Waterproofed upstand detailing is usually weathered with lead or metal counter-flashings, metal capping and cladding. Termination bars should only be used when fixing to concrete abutments, where no provision exists for other forms of secondary weathering.

**Waterproofing beneath rendered upstand requires increasing.**To comply with codes of practice the waterproofing should be dressed up the upstand to a minimum height of 150mm above the new finished roof level. This will require cutting back the render to the nearest horizontal mortar joint to achieve a minimum 150mm upstand. New counter-flashing are then to be installed and the render made good.

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| Upstands to rendered wall abutment | Upstands to rendered wall abutment |

**Gaining access to re-waterproof the abutment behind tiles/ slates**The lower courses of tiles/ slates from the adjacent abutment will need to be removed in order to allow access to re-waterproof the upstand behind and if necessary extend the supporting lay-board.

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| Vertical slate elevation |

**Removing existing extractor vents to increase the kerb height**The existing powered extractor vents need to be removed to allow the kerb to be raised to provide the required minimum height.

### Rooflights

The current rooflights are proprietary plastic glazed units. These fall below current thermal and light transmittance standards and the performance will continue to decrease with age. The service life of these rooflights is not compatible with the service life of the new waterproofing system and for these reasons we propose that they are replaced. Please be aware that these units may contain asbestos in the internal linings.

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| Existing Roof Lights | Existing Roof Lights |

### Plant

The roof mounted AC units appear to be functional, they are positioned on or very close to the roof. We assume they are to be retained on the roof following any refurbishment of the waterproofing. Unfortunately it will not be possible to refurbish the area of waterproofing beneath the AC units due to their proximity to the waterproofing membranes. They will require temporary disconnection and relocation while the roof is refurbished.

Existing methods of allowing pipes and cables to penetrate through roof are inadequate. The current detail cannot be maintained as part of the roof refurbishment. The existing pipes and cables will require disconnection and a new proprietary cable penetration sleeve installed.

The existing items of M&E equipment are located on or very close to the surface of the waterproofing. The proximity of the equipment to the waterproofing will prevent access to re-waterproof. To allow the refurbishment to take place the equipment will require temporary disconnection and be set aside for later reinstatement.

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| Existing Plant | Existing Plant |
|  |  |
| Existing Plant | Existing Plant |

# Proposals

## Roof Area 1

* The existing deck is to be re-used.
* Carefully remove the waterproofing system, including insulation materials, as far as the surface of the existing vapour control layer. Remove all debris and insulation residue to provide a surface suitable for overlay. The existing waterproofing must also be removed from all upstands, edge detailing, and from penetrations such as outlets or vent pipes etc. and the exposed surfaces prepared for receiving the new waterproofing. Cut, seal and make good all loose or damaged areas of the remaining vapour control layer to provide an adequate surface for receiving the new overlay system. Fully clean and thoroughly prime all surfaces receiving the new waterproofing with fast drying bitumen primer and allow it to dry thoroughly.  
    
  Note - an adequate provisional sum should be set aside to cover for any unforeseen issues related to the removal of the existing waterproof covering and preparing the existing vapour control layer.
* We propose that the insulation is upgraded although due to height restrictions will not comply with current Energy Conservation Regulations, although will still improve the thermal performance of this building and offer longer term payback in respect of reduced heating and/or cooling costs. In areas where a reduced thickness of insulation is required it will be in line with BS6229:2018 and Building regulations Approved Document C where the worst U-value allowed will be 0.35W/m²K equivalent to 60mm of Bauder PIR FA-TE flat board insulation.
* The existing rainwater outlets are in reasonable condition and still functional and are considered suitable for re-use.
* The waterproofing upstand is to be raised to achieve the minimum required height of 150mm. Counter-flashings are to be positioned to suit. There will be areas where this is not possible (Balustrade abutments etc)
* Once the new waterproofing upstands have been formed against the abutment wall a 25mm deep chase is to be cut into the wall and new counter flashings are to be fixed and sealed into the chase.
* The existing powered extractor vents mounted on builders kerbs will need to be decommissioned and temporarily removed in order to allow the kerb to be raised to the required minimum height and then re-waterproofed. Provision should be made for modifying any internal linings etc.
* The existing rooflights should be replaced with new modular Bauder Rooflight units that offer improved thermal and light transmittance performance and are classified as being non-fragile These will complement the performance of the replacement waterproofing system during its serviceable life. Please advise your requirements and we will include these within our separate schedule and specification for replacement Bauder Rooflights.
* Temporarily disconnect the existing cables/ pipes and remove the current pipe penetration sleeve. Install new proprietary pipe conduit in conjunction with the refurbishment of the roof. Pipes/ cables can then be taken through the new conduit and reconnected.
* To enable access for the re-waterproofing works, all roof mounted plant will require temporary disconnection and be set aside for later reinstatement.

## Roof Area 2

* To avoid damaging the woodwool deck and the risk of making the deck unstable where the waterproofing system is in a suitable condition it should be overlaid in its entirety. In situations where the insulation and waterproofing material requires removal, the existing system should be carefully stripped back to the existing bituminous vapour control layer, carrying out any necessary surface repairs/damage resulting from the removal of the layers above. Then install a new overlay waterproofing system to the bituminous surface.  
    
  Proposals to overlay to the existing waterproofing system are submitted on the basis that we cannot accept responsibility for the quality of the multi-layers of attachment of the existing waterproofing system or the structural integrity and condition of the roof deck, especially as in this instance where it is classified as ‘Fragile’ by the current ‘Health & safety in roof work’ (HSG33). Due to the existing waterproofing being in-situ, we can only make a limited evaluation of what exists and offer our best assessment based on the information available, therefore the decision to overlay must be by the Specifier.
* Carefully remove the waterproofing system, including insulation materials, as far as the surface of the existing vapour control layer. Remove all debris and insulation residue to provide a surface suitable for overlay. The existing waterproofing must also be removed from all upstands, edge detailing, and from penetrations such as outlets or vent pipes etc. and the exposed surfaces prepared for receiving the new waterproofing. Cut, seal and make good all loose or damaged areas of the remaining vapour control layer to provide an adequate surface for receiving the new overlay system. Fully clean and thoroughly prime all surfaces receiving the new waterproofing with fast drying bitumen primer and allow it to dry thoroughly.  
    
  Note - an adequate provisional sum should be set aside to cover for any unforeseen issues related to the removal of the existing waterproof covering and preparing the existing vapour control layer.
* We propose that the insulation is upgraded to comply with current Energy Conservation Regulations, which will improve the thermal performance of this building and offers longer term payback in respect of reduced heating and/or cooling costs. In areas where a reduced thickness of insulation is required it will be in line with BS6229:2018 and Building regulations Approved Document C where the worst U-value allowed will be 0.35W/m²K equivalent to 60mm of Bauder PIR FA-TE flat board insulation.
* New Bauder Refurbishment Outlets are to be installed that are compatible with the new waterproofing system and suitable for the connection to existing drainage pipework. As refurbishment outlets fit within existing outlets or pipe work, it is important that the flow rates of the new outlets are compared against the current outlets to ensure that drainage performance is not reduced or otherwise confirm if additional drainage provision may be required.
* The waterproofing upstand is to be raised to achieve the minimum required height of 150mm. Counter-flashings are to be positioned to suit.
* Once the new waterproofing upstands have been formed against the abutment wall a 25mm deep chase is to be cut into the wall and new counter flashings are to be fixed and sealed into the chase.
* The lower courses of tiles from the adjacent abutments will need to be removed to re-waterproof the upstand. This work should include provision for extending the lay-board to accommodate the change in surface level imposed by the new insulation in order to comply with the required minimum upstand height. As a consequence of these works, the lower course of tiles may need adjusting.
* The existing powered extractor vents mounted on builders kerbs will need to be decommissioned and temporarily removed in order to allow the kerb to be raised to the required minimum height and then re-waterproofed. Provision should be made for modifying any internal linings etc.
* The existing rooflights should be replaced with new modular Bauder Rooflight units that offer improved thermal and light transmittance performance and are classified as being non-fragile These will complement the performance of the replacement waterproofing system during its serviceable life. Please advise your requirements and we will include these within our separate schedule and specification for replacement Bauder Rooflights.
* The roof mounted AC units are to be disconnected and temporarily relocated while the roof is re-waterproofed. The AC units are then to be repositioned on suitable surface protection and reconnected.
* Temporarily disconnect the existing cables/ pipes and remove the current pipe penetration sleeve. Install new proprietary pipe conduit in conjunction with the refurbishment of the roof. Pipes/ cables can then be taken through the new conduit and reconnected.
* To enable access for the re-waterproofing works, all roof mounted plant will require temporary disconnection and be set aside for later reinstatement.

## Proposed Waterproofing System

Roof Area 1 and Roof Area 2

Bauder Total Roof System (BTRS)

The Bauder Total Roof System (BTRS) includes the most advanced bitumen membranes currently available. The system offers the highest levels of performance supported by the most comprehensive guarantee in the market. For maximum flexibility our membranes are manufactured using highly modified SBS elastomeric bitumen and very high tensile reinforcing layers that means this sophisticated waterproofing system offers the ultimate flat roof solution.  
  
Where required the system will include Bauder PIR insulation with a choice of either glass tissue or aluminium facing offering versatility in installation methods for both the insulation and the membranes. Bauder insulation provides excellent thermal performance and has outstanding dimensional stability and compressive strength, achieving an “A” rating in the BRE Green Guide.  
BTRS is suited to both new build projects and the refurbishment of existing buildings.  
  
**Guarantee Information**This system is supplied with a 20 year guarantee that covers products, workmanship, design, consequential damage and financial loss. Full terms and conditions are available by request.

**Key Features**

* Insulation and waterproofing products are all manufactured by Bauder resulting in complete system compatibility and single source responsibility.
* Robust and extremely durable waterproofing that minimises the risk of physical damage and is capable of withstanding foot traffic.
* These products are BBA certified and can achieve BROOF(t4) fire rating as detailed in the BBA Certificate. If you cannot find the fire tested system you are looking for within the BBA certification, please contact our technical department for further details.
* 5mm cap sheet with high tensile strength and choice of 3 colours.
* Bauder site technicians monitor and sign off each installation and provide up-to-date inspection reports directly to our clients via email.
* Bauder provides installation training for our approved company operatives ensuring the highest quality of workmanship is maintained.
* Reliable application in both high and low ambient temperatures – enables all year round installation.
* Reduced rain noise to gain an extra credit under point 5 of section Hea of BREEAM education 2008 for most projects.

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| BTRS System Summery |

# Health & Safety and Construction Design Management

Bauder believes in promoting a strong safety culture at all times. Our Staff will adhere to the appropriate risk assessments and method statements as required under the Health and Safety at Work Act 1974 and Work at Height Regulations 2005. It is the client’s duty of care to advise of any specific health and safety issues pertaining to the project as required under the Work at Height Regulations 2005.

As part of our duty of care we would like to draw attention to the following information:

The HSE Guide H&S in Roof Work (HSG33) states that **all** roofs should be treated as fragile unless declared otherwise by a competent person. Please refer to the Work at Height Regulations 2005 provision 9 for information on working with fragile/suspected fragile roof areas. Under the Health and Safety at Work Act 1974 Sections 3 and 4, it is the responsibility of employers and anyone who controls the work of others to ensure so far as it is reasonably practicable that persons are not exposed to risks that impact on their health and safety. Appropriate control measures must be in place before any work or contact with a fragile/suspected fragile roof area commences.

Safe access and egress to a roof is a major risk and requires careful planning. In particular, the following are likely to be fragile:

* Non reinforced fibre cement sheets e.g. asbestos
* Corroded metal decking
* Woodwool slabs
* Rotten chipboard or similar
* Stramit
* Slates or tiles
* Old roof lights
* Glass (including wired)

Specifying non fragile rooflights will help reduce the risk of falls from height. A non-fragility rating is required by the HSE (Health and Safety Executive) in order to comply with CDM (Construction Design and Management) Regulations 2015.  
  
We draw your attention to your duties under the Construction (Design and Management) Regulations 2015. Regulation 4, Client’s duties in relation to managing projects states that the client must make suitable arrangements for managing a project, including the allocation of sufficient time and other resources. Regulation 5, Appointment of the Principal Designer and the Principal Contractor states that where more than one contractor will be working on a project at any time, the client must appoint a Principal Designer and a Principal Contractor.  
  
Please note that although Bauder will assist with the roof waterproofing system design, we will not undertake the role of Principal Designer.  
  
It is always the responsibility of the contractor to carry out a risk assessment on all aspects of the contract. The ‘Safe2Torch’ checklist is solely for guidance for the safe installation of torch-on reinforced bitumen membranes and use of gas torches in the workplace.