Roof Survey **Report**

Whiterock Academy
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1 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.

1.1 Description of Building and Weather Conditions

Building use – Educational
Height in Storeys: - Single

The weather conditions at the time of our survey inspection were dry and warm
The Roof surface at the time of our survey was dry

1.2 Roof Access

Roof access was gained externally using a single storey surveyor's ladder.

1.3 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.

1.4 Roof Plan

1.4.1 Roof 1, Roof 2

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

2 Existing Roof Construction

2.1 Core Sample Analysis

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.

2.1.1 Roof 1

No. of core samples taken: 1

Construction Type: Warm Roof

Surfacing: Slate mineral finish
Waterproofing: SBS modified built-up bituminous membrane system
Insulation: Rigid PUR/ PIR board 50mm
Vapour Control: Bituminous membrane vapour control layer
Roof Deck: Profiled metal

Condition of core sample: The core showed that the existing build up was dry and would be suitable to overlay

Core 1

2.1.2 Roof 2

No. of core samples taken: 1

Construction Type: Warm Roof

Surfacing: Slate mineral finish
Waterproofing: SBS modified built-up bituminous membrane system
Insulation: Rigid PUR/ PIR board 60mm thick
Vapour Control: Bituminous membrane vapour control layer
Roof Deck: Timber boarding

Condition of core sample: The core showed that the roof was dry and would be suitable to overlay

Core 2

3 Issues and Considerations

3.1 Roof 1

3.1.1 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.

3.1.2 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.

Overview of the roof area

Overview of the roof area

The condition of the existing waterproofing is of concern. The material covering is coming to the end of its serviceable life and demonstrating signs of age, fatigue and fragility that could lead to serious failure.

Any water ingress would affect the upgrade potential of retaining the current system as part of an overlay solution. Investing in refurbishment works now offers the opportunity of minimising costs by using the existing waterproofing as a component of an overlay system.

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.

The existing felt is old and starting to loose its mineral cover

The current level of insulation falls below the 0.35 w/m2k required

3.1.3 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.

At the time of our survey the roof surface was dry. However, we noted visual evidence that some standing water does occur on the roof surface after rainfall. This indicates inadequate falls which can be viewed as undesirable, excessive standing water can impact the performance of the roof and/or supporting structure. Adequate falls should be provided as part of the roof refurbishment in accordance with BS6229:2018.

Tide marks are evident and would suggest that roof holds water

3.1.4 Drainage

The current outlets are considered unsuitable for reuse. However, it will prove problematic to remove these without causing damage to the existing pipework or otherwise gain suitable access to re-connect any replacement units. Therefore, we propose leaving these in-situ and installing refurbishment outlets that can be fitted from above without causing internal disturbance. This is based upon the presumption that the internal pipework is currently in serviceable condition and secure and that the use of a refurbishment outlet does not significantly reduce flow rate performance. You may also wish to consider inspecting the existing pipework to confirm its condition and suitability, given the longevity of the new waterproofing system.

The existing outlets are old and missing leaf guards and appear to have slumped in areas

Outlet has slumped

3.1.5 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 brickwork upstand requires increasing

To comply with codes of practice the waterproofing should be dressed up the brickwork 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.

Existing cavity tray within abutment wall

We noted that an existing cavity tray is present within the abutment wall. Should this roof be refurbished, this cavity tray will have to be raised as a consequence of the new waterproofing system.

The existing cavity trays will need to be raised with a new lead cover flashing

Low Upstands beneath Clerestory Windows

Once the roof has been refurbished there will not be sufficient height beneath the existing clerestory windows to form a sufficient waterproofing upstand. Due to new surface levels it will be necessary to remove and replace the clerestory windows with smaller units to fit a reduced opening.

Removal of vertical cladding for access to re-waterproof

The existing cladding obstructs access to re-waterproof the upstand. It will therefore be necessary to remove the cladding to enable the roofing works to be undertaken. Upon completion the cladding can be reinstated allowing for any modification that maybe required.

Cladding will need to be removed to allow the new system to be taken vertically

The existing windows may need to be raised depending on the new roof height

Increasing the height of perimeter kerbs

When the waterproofing is refurbished the perimeter check kerbs will not provide a 50mm upstand above the finished roof level. As a consequence the perimeter kerb will require raising.

Necessity for extending the existing perimeter fascia boards

By increasing the height of the perimeter kerb detail it will be necessary to include provision for either adding to the existing fascia boards or completely renewing them.

The existing kerbs will need to be raised as part of the works

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.

Extending the existing soil vent pipes

The change in surface level, once the new waterproofing system is installed, will necessitate

extending the existing soil vent pipes. This is to ensure there is sufficient provision for forming the waterproof upstand detailing to the pipes and fitting any secondary weathering collars.

3.1.6 Rooflights

The current polycarbonate rooflights remain functional, are in good condition and considered suitable for re-use.

The rooflights are Georgian wired glazing within metal frames mounted upon a builders kerb. These rooflights are single glazed, thermally inefficient and prone to condensation. These should be considered unsuitable for re-use and replaced.

Please be aware that these units may contain asbestos in the internal linings, rope seals or glazing putty.

The existing polycarbonate rooflights can remain

The existing wired glass rooflights will need to be changed for new fall safe units

3.1.7 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.

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.

The existing AC and plant will need to be removed to allow the works to be installed

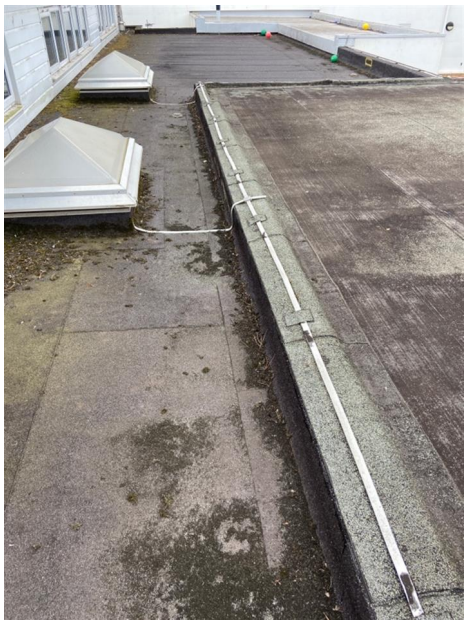
3.2 Roof 2

3.2.1 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.

3.2.2 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.



Roof overview

The condition of the existing waterproofing is of concern. The material covering is coming to the end of its serviceable life and demonstrating signs of age, fatigue and fragility that could lead to serious failure.

Any water ingress would affect the upgrade potential of retaining the current system as part of an overlay solution. Investing in refurbishment works now offers the opportunity of minimising costs by using the existing waterproofing as a component of an overlay system.

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.

The existing system just provides the minimum 0.35 w/m2k u value

The existing felt system is starting to loose its mineral cover

3.2.3 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.

3.2.4 Drainage

The current outlets are considered unsuitable for reuse. However, it will prove problematic to remove these without causing damage to the existing pipework or otherwise gain suitable access to re-connect any replacement units. Therefore, we propose leaving these in-situ and installing refurbishment outlets that can be fitted from above without causing internal disturbance. This is based upon the presumption that the internal pipework is currently in serviceable condition and secure and that the use of a refurbishment outlet does not significantly reduce flow rate performance. You may also wish to consider inspecting the existing pipework to confirm its condition and suitability, given the longevity of the new waterproofing system.

The existing outlets should be renewed with refurb outlets

3.2.5 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.

Removal of vertical cladding for access to re-waterproof

The existing cladding obstructs access to re-waterproof the upstand. It will therefore be necessary to remove the cladding to enable the roofing works to be undertaken. Upon completion the cladding can be reinstated allowing for any modification that maybe required.

The existing cladding should be removed to allow the waterproofing to be installed

3.2.6 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.

The existing rooflights should be replaced with new fall safe units

4 Proposals

4.1 Roof 1

- The existing deck is to be re-used.
- The condition of the existing waterproofing is considered suitable for receiving an overlay system.
- 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.
- Bauder Tapered Insulation will be incorporated into our specification, as provision for creating a minimum fall of 1:80 on all areas of the roof in accordance with BS6229:2018. Our standard design will direct water to drainage outlets, sumps and external gutters.
- 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.
- New cavity trays need to be installed, positioned at the required height above the bed joint where the upstand waterproof terminates. Work will need to be done sequentially i.e. opening the brickwork up in sections to install the new tray.

  The installation of new cavity trays should be carried out prior to removing the existing waterproofing system. This will avoid the risk of damaging the new system and creating debris on the new finished surface. Provision must include for re-positioning and installing the new lead counter-flashings.
- The existing clerestory windows are to be removed to allow access to raise the upstand kerb in preparation for re-waterproofing. New counter flashings must be installed prior to the new resized window units being fitted. Work should include making good and redecoration.
- Provision should be made for temporarily removing the cladding to allow working access to raise and waterproof the abutment upstands. Allowance is to be made for trimming the cladding and modifying the position of the lower fixing rails and/or metal drip flashing where required.
- The height of existing perimeter check kerbs must be increased to provide a minimum 50mm upstand above the finished roof level. The perimeter is to be raised to one consistent level around the full roof area.

- An additional depth of fascia board is to be installed to cover the new perimeter kerb. Alternatively the existing perimeter fascia boards could be renewed in their entirety. Any new fascia system to be installed to cover the perimeter kerb should be manufactured from a maintenance free material to offer a life expectancy that is at least comparable to the guarantee of the new waterproofing system. This avoids the risk of disturbing the waterproofing system or affecting the roof guarantee, should the existing fascia require replacing whilst the roof remains in-situ. Full details of the system and scope of works to the facia boards is to be included within the main client specification/ schedule of works.
- 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.
- Provision should be made for extending the existing soil vent pipes in order to accommodate the increase in the finished surface level resulting from the thickness of the new waterproofing system.
- 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.
- To enable access for the re-waterproofing works, all roof mounted plant will require temporary disconnection and be set aside for later reinstatement.

4.2 Roof 2

- The existing deck is to be re-used.
- The condition of the existing waterproofing is considered suitable for receiving an overlay system.
- 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.
- Provision should be made for temporarily removing the cladding to allow working access to raise and waterproof the abutment upstands. Allowance is to be made for trimming the cladding and modifying the position of the lower fixing rails and/or metal drip flashing where required.
- 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.

4.3 Proposed Waterproofing System

Roof 1 and Roof 2

Bauderflex Roof System

The Bauderflex Roof System offers an exceptional waterproofing solution to the specifier working with a limited budget, whilst still delivering a robust quality system with proven longevity. This product uses high tensile polyester reinforcement with highly modified SBS elastomeric bitumen. This produces a finished product with an elasticity of over 40%.

Where required the system will include Bauder PIR 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. Bauderflex is suited to both new build projects and the refurbishment of existing buildings.

Guarantee Information

The Bauderflex system is supplied with a 20 year guarantee that includes products and workmanship. 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 maintenance foot traffic.
- Bauderflex has an outstanding track record and has been used in the UK for over 30 years with proven durability in service. This provides complete peace of mind to specifiers past and present.
- 4.2mm 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 site inspection reports directly to our clients via email.
- Bauder provides installation training for our approved contractor operatives to ensure the highest quality of the workmanship maintained.
- Reliable application in both high and low ambient temperatures – enables all year around installation.
- Reduced rain noise to gain an extra credit under point 5 of section Hea of BREEAM education 2008 for most projects.

5 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.