GUIDANCE FOR REPAIR GRANTS

ANNEX: HES ADVISORY STANDARDS FOR REPAIR GRANTS

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

CONTENTS

USING THIS GUIDANCE

This guidance is for anyone applying for, or in receipt of, funding to undertake work to an historic environment asset supported by a grant from Historic Environment Scotland (HES). This includes owners of historic environment assets, or others taking responsibility for them, and their project team including their Professional Adviser and contractor.

It sets out our professional approach to repair and consolidation of historic environment assets, and what is likely to qualify for HES grant assistance unless stated otherwise.

These advisory standards are set out in the following sections:

- Introduction and Overview
- Further Sources of Information
- Section 1: Project Development
- Section 2: Interim Works
- Section 3: Repair Work to Buildings
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- Section 6: Other Forms and Parts of Monument
- Section 7: Carved Stones

This guidance may also be used to guide the repair of traditionally built structures where best practice is sought out with HES grants programmes.

This guidance replaces our previous 'Advisory Standards of Conservation and Repair' document for use on our new grant programmes from 2022 and is a working document that will be reviewed and updated as required.

Professional liability

The following advisory standards are intended to inform the applicant and guide the Professional Adviser and design team in development of project details, specifications, and methods. They should not be considered of adequate detail to be used as specifications and method statement in themselves.

Please note that the following guidance is for grant-aid purposes only and does not imply any professional liability upon HES for the project design, specification or works on site. Professional liability remains solely with the Professional Adviser and design team as per terms of engagement between individual practitioners / firms and their clients. Liability for works of site will be as per building contracts in addition to the terms of professional engagement.

INTRODUCTION AND OVERVIEW

These advisory standards are intended to assist in the execution of works to historic environment assets in Scotland.

If you are applying to HES or have been awarded any HES funding for repair or consolidation works under any of our new funding programmes from 2022, this document provides guidance on the materials and standards we require to be used in a grant-aided scheme. Management of the works must also meet the current requirements of Health and Safety legislation.

We will expect you to work with your Professional Adviser to develop proposals to a high standard of conservation practice. It is equally important that the subsequent works on site are also managed by your Professional Adviser to ensure these high standards are continued during the works to deliver the completed project.

Proposals to undertake any works to a historic environment asset may require statutory consents (Scheduled Monument Consent, Listed Building Consent, Planning Permission and Building Warrant) which do not form part of your grant application i.e., an award of grant does not give any statutory consent. Receipt of statutory consents does not mean that your proposals qualify for HES grant funding, or that the proposed work will meet our expected standards for grant-aided works. Be aware that the requirements of statutory consents may vary from the standards required by this guidance.

For scheduled monuments, where the consent process is handled by Historic Environment Scotland (HES), we aim to work internally to ensure our consent and grant advice aligns. However, please note that the grants and consents systems remain separate and receipt of one does not guarantee the other.

In addition to the above consents for the historic environment asset, you may need other types of consents which relate to its site and natural habitat. Planning for work should include assessment and survey, if required, to protect the natural diversity within the area, for example Sites of Special Scientific Interest, and to account for protected species such as bats and nesting birds. This may require monitoring or survey work prior to the works and, depending on the outcome, this may affect your project schedules. Further information should be sought from NatureScot, SEPA and other nature protection groups.

FURTHER SOURCES OF INFORMATION

Historic Environment Scotland

Historic Environment Scotland (HES) publish national policy for the protection and management of the historic environment including the Historic Environment Policy for Scotland (HEPS) and the Scheduled Monument Consents Policy.

HES also has many publications providing guidance and information on a broad range of subjects for a variety of audiences, the different series of which are linked below. Please note that not all aspects of these publications will be grant-eligible, and you should refer to Sections 2 to 7 of this guidance for further information on what is grant-eligible.

All Publications

Technical Advice Notes: a series of older publications giving detailed technical advice on traditional repairs and recommended building processes.

Short Guides: a series of free and downloadable documents providing advice and practical guidance on a range of topics in relation to traditional buildings and skills. The series is aimed at practitioners and professionals but may also be of interest to other contractors and property owners.

INFORM Guides: a series of free and downloadable A5 leaflets giving an overview and key information on a range of topics relating to traditional skills and materials, building defects and the conservation and repair of traditional buildings. The series is largely aimed at homeowners and has over 50 titles covering topics such as: ventilation in traditional houses, maintaining sash and case windows, domestic chimneys and flues, damp causes, and solutions, and improving energy efficiency in traditional buildings.

Guides for Practitioners: these publications provide technical advice and guidelines to practitioners and developers in the conservation field, as well as to local authorities, regarding specific building and conservation matters, such as Fire Safety and converting traditional buildings.

Technical Papers: this free and downloadable series of documents disseminates the results of research carried out or commissioned by HES. They largely focus on topics related to energy efficiency measures but also cover topics such as indoor air quality, historic masonry finishes, architecture and health, or other specific research topics.

Refurbishment Case Studies: a series of free and downloadable case studies that detail practical applications concerning the conservation, repair, and upgrade of traditional structures. The Refurbishment Case Studies seek to show good practice in building conservation, and the results of some of this work form part of the evidence base of our technical guidance.

Managing Change in the Historic Environment: a series of free and downloadable guidance notes about making changes to historic environment assets.

Ancient Monument Guidance:

- Fawcett R: The Conservation of Architectural Ancient Monuments in Scotland,

The Scottish Executive: Carved Stones Policy and Guidance

Third party funders

HES grant funding can also be distributed by third party organsiations through our Heritage & Place Programme (H&PP) and City Heritage Trusts (CHT). Whilst all grants awarded by other organsiations using HES funds should meet the requirements of these Advisory Standards, the type of projects which are eligible for funding may vary.

HES funding support for Scotland's cities is managed by CHT's and can cover a broad range of historic environment assets as identified through individual Trust strategies and grants programmes. We advise you check with the individual delivery organisation for more information on what grants are available.

- Aberdeen CHT
- Dundee Historic Environment Trust
- Edinburgh World Heritage
- Glasgow CHT
- Inverness CHT
- Perth and Kinross Heritage Trust
- Stirling CHT

SECTION 1: PROJECT DEVELOPMENT

1.1 Approach and principles

At the commencement of any proposed works to a historic environment asset, the owner and design team should discuss their approach to the project and adopt the principles that will guide repair and intervention of its historic built fabric. Broadly we seek an approach of conservative and respectful repair. It is important that proposed works adopt a cautious, studied approach as set out in various international conservation charters, Historic Environment Policy for Scotland (HEPS) and the Scheduled Monument Consents Policy. Further reference can also be made to BS7913: 2013 Guide to the conservation of historic buildings.

Any works to monuments or structures included in sections 5-7 of this document should be based on a principle of minimum intervention, with work limited to essential works to protect the cultural significance of the asset. If repair work is required, the consolidation of ruined structures should seek to arrest structural issues or erosion, protect significant details, and sensitively improve access and safety if required. Ideally, any intervention should be reversible.

1.2 Significance

Your approach should begin with an understanding of the historic environment asset's history and significance, the behaviour of its materials and construction, its historic evolution, and former uses, and how it currently functions alongside the implications of any proposed change. The cultural significance of the asset should not be compromised. Depending on the significance of the historic environment asset, and the scale of works proposed, you may consider preparing a statement of significance or a conservation plan.

1.3 Repair

When we use the term 'repair 'in this guidance, we are generally using this in connection with works to buildings. For buildings, our main objective of repair works is to bring a building into a satisfactory condition, without compromising its significance. Refer to **Section 3: Repair work to buildings** for further information. Ancient monument work will generally use various methods of consolidation and careful conservation to ensure minimum intervention to secure the longer-term survival of the monument in the form it survives today.

1.4 Reinstatement

We do not normally give grants for speculative reinstatement. We would expect any reinstatement to be based on sound physical and/or photographic evidence and to retain any remaining significant historic fabric, for example historic elements of an existing shopfront. However, this evidence may not be available in every case. In those exceptional circumstances, new works designed by the Professional Adviser, based on

local precedent, and using appropriate traditional materials may be considered. We will ask you to explain the case and provide justification for the reinstatement, and the proposed design. Refer to **Section 3: Repair work to buildings** for further information.

1.5 Demolition and removals

The removal of any part or element of a building or ancient monument, or the removal of complete structures, is not normally grant-eligible. There may be exceptional circumstances where removal is appropriate, for example: the work is essential to protect historic fabric and/ or where there is a structural need; the removal of later work which significantly obscures the original design of the asset; careful dismantling of fabric or elements at risk to allow reconstruction/ reinstatement; the careful dismantling of a structure that poses a risk to surrounding historic assets. Any measures that propose demolition of an asset, or partial removals of historic fabric, must be carefully assessed and receive necessary consents prior to any grant award. There may be opportunities to salvage materials where demolition is involved.

1.6 Assessment of risk

An assessment of the historic environment asset's condition is essential to identity risks, such as any fabric defects, and to determine the asset's appropriate conservation including repair and/or consolidation works. The scope and scale of a condition survey should be tailored to suit the individual historic asset. For buildings, we would expect the Professional Adviser to undertake an initial condition assessment. For ancient monuments, this assessment will normally be dealt with through pre-application advice and on-site meetings with HES.

The initial assessment may identify other investigations required to evaluate the asset in more detail. This may include, for example: structural survey and monitoring; environmental monitoring; specialist surveying including thermal imaging and endoscopy; archaeological analysis and investigations; dendrochronological, stone, mortar, or paint analysis. Requirements for further investigation should be agreed with HES, if your grant application is progressing, and some may be grant-eligible.

1.7 Health and safety practice

We expect that statutory duties owed by clients, advisers, and contractors relative to health and safety will be delivered. This includes but is not limited to the Health and Safety at Work Act, Management of Health and Safety at Work Regulations, and the Construction Design Management regulations. We expect and support exemplary best practice in relation to the management of materials hazardous to health and more specifically silica dust and respiratory impacts.

1.8 Management and maintenance

Depending on the significance of the historic environment asset, its condition, current management, and the level of grant award you receive, we may ask you to prepare documents to assist in the future management and maintenance of the asset. This may include a conservation management plan and/ or a maintenance plan. Even where we do not require you to submit such documents, you should consider these issues and commit to good management and maintenance of the asset after the completion of the project works.

1.9 Use of traditional materials and methods

Works to the existing fabric should adopt the traditional materials, craft skills and construction techniques found in the original building where appropriate. Where circumstances allow local materials should be used and sustaining sources of indigenous materials is encouraged. In repair work, an important consideration is matching the new material with the existing. Incorrect selection of material, often for perceived reasons of improved durability and lower cost, can often result in a shorter lifespan of repairs and accelerated damage to existing fabric. The procurement of traditional materials such as stone, slate, suitably dimensioned timber, lead and iron work should be considered at an early stage.

1.10 Sustainability and climate resilience

The resilience of historic environment assets is affected by an increased frequency of unusual weather events such as rapid and significant temperature changes, storm conditions with severe wind forces, and intense and prolonged rainfall. In preparing your project proposals, the opportunity should be taken to assess the asset's climate resilience and consider if measures to mitigate the effects of climate change, which would not harm the significance of the historic environment asset, could be undertaken. For buildings, alongside regular maintenance, appropriate repair, and detailing will prolong a building's lifespan and ensure its sustainable future. Refer to HES Short Guide 11: Climate Change Adaptation for Traditional Buildings for further information.

In the case of ancient monuments, increased rainfall, and more rapid change between hot/cold and dry/wet conditions, can increase risk especially around wall heads, drainage and water shedding, and possible movement, for example of carved stones. Where ancient monuments are judged to be under threat, climate mitigation measures may be considered including appropriate repair and consolidation works, new shelters, structural support, and ground consolidation.

1.11 Circular economy

The repair and re-use of a historic building is an inherently sustainable practice and works to retain the building's embodied energy, supporting the circular economy and Zero Waste strategy. Most traditional materials are

by their nature of low embodied energy and low toxicity and their increased use is a specific objective of HES Grants programmes.

1.12 Energy efficiency and the retrofit of buildings

The appropriate thermal upgrade of buildings is now necessary for many reasons. When planning conservation work, improvements in the performance of the fabric should be made where the nature of the construction permits. Such improvements can be part of grant-aided works on eligible elements in a project. This might include for example: roof insulation during slating works, or window / glazing upgrades where replacement is necessary. Possible measures are described in the HES Guide to Energy Retrofit of Traditional Buildings.

Not all energy efficiency measures will be grant-eligible, and measures will only be grant- eligible where they do not put the asset's cultural significance or fabric at risk. Where appropriate, you may consider other ways to reduce the building's operational energy use through the installation of zero or low-carbon heating systems, as well as the reinstatement of passive measures. Refer to **Section 4: Ancillary work to buildings** for further information. Any measures that propose a change to the character and appearance of the historic environment asset, or loss of original fabric, must be carefully assessed and receive necessary consents prior to any HES grant award.

1.13 Ventilation of buildings

With a proper understanding of the principles for ventilation, the performance of historic buildings can be improved considerably for both buildings and occupants. Retention and repair, or reinstatement of traditional passive ventilation, is favourable to the installation of new mechanical systems with potentially high operational and embodied carbon impacts.

1.14 Access to ancient monuments

Ancient monument projects should primarily focus on conservation repairs. However, in some cases it may be appropriate to also consider how public access may enhance the enjoyment of a monument and how it is experienced and appreciated. This may include paths, new floors/surfaces, viewing platforms, high level access, etc. Direct impacts on a monument's historic fabric should be minimised.

1.15 Archaeology

Works which may require 'groundbreaking 'to take place, may impact upon archaeological earthworks and/or sub-surface archaeological structures and

deposits. Examples of necessary works might include establishing site facilities to carry out the works; underground services for drains, heating installations and lightning conductors; external landscaping or foundations. Explorations, to understand phasing/construction/structural issues, may also have potential archaeological impacts. This may equally be relevant for

changes to upstanding archaeological stonework and masonry, depending on the specific project.

Where it is likely an assessment of the archaeological impacts will be required, this should be highlighted at the earliest stages to put measures in place to identify and ideally retain significant archaeological features. Where identification and retention are not achievable, then proposals for mitigation, avoidance of damage, and recording will require to be discussed with HES. Any proposed groundworks, including investigations, within sensitive areas may require an archaeologist. An archaeologist may also be required where change is proposed to sensitive upstanding historic features, stonework, or masonry.

1.16 Contractor selection

Carefully consider the selection of suitably skilled contractors and craft persons to be engaged on the project. This includes the consideration of relevant working experience on similar historic buildings, ancient monuments, or other historic environment assets as applicable to the project. Also, consider their experience in the work methods and materials to be used, for example the National Progression Award (NPA) in Traditional Masonry for stonemasons and other relevant SCQF (Scottish Qualifications Framework) qualifications.

SECTION 2: INTERIM WORKS

2.1 Principle of interim work

The principle of interim work is to protect an historic environment asset that is at risk from deterioration, damage, or collapse, and to mitigate risks which could lead to the loss of the asset. If risks are addressed early on, the historic fabric can be preserved both in relation to its cultural significance, and within an acceptable economic framework for future works.

The type of suitable interim work measures will vary depending on the specific asset but may include:

- Urgent / emergency fabric repairs to protect and/or stabilise an asset.
- Repairs to make an asset safe and usable for temporary 'meantime' or exploratory uses.
- Temporary repairs and/or protective works to safeguard an asset such as roofing and drainage to shed water, structural propping and shoring, temporary weatherproofing, protective structures, and removal/control of damaging plant growth.

2.2 Repair in interim works

Interim work may be delivered using less substantial materials than a full conservation repair or consolidation project would require and a different working specification to those outlined in Sections 3 to 7 of this guidance. In some cases, selected temporary reversible repairs, delivered using non-standard materials in key areas of building failure, can prevent significant decorative and structural damage, 'buying time' while resources are found for a more holistic repair. However, the application and the detailing of interim works should be of a reasonable quality and suitable for the anticipated lifespan of its use.

2.3 Materials in interim works

For interim works, the objective is to protect the historic fabric for the short to medium term and often in a short timescale. Therefore, materials that are quickly worked and of modest cost are likely to be most suitable. Materials may be more temporary in nature and might include for example: mineral felt or profiled sheet materials for roof repairs; temporary plastic rainwater goods; tarpaulins weighted with sandbags for exposed wallheads. Such works should generally be designed to be reversible and cause minimal damage to the historic fabric of the existing asset. However, durability remains important and in some cases the replacement of traditional materials 'like for like' may be possible, especially if they may be retained in the future repair.

2.4 Priorities

Interim works can never address all pertinent issues. Activity should be resourced, and primary considerations should be given to the following areas when planning interim works.

1. **Ensure structural stability.** Legacy damage may continue to affect the stability of the asset and therefore additional supports may be required. This might be in the form of adjustable props, timber baulks or piers built up in engineering brick. Appropriate vegetation removal may also reduce risks of structural instability.

2. **Prevention of water ingress**. Any interim work should focus on shedding water from the asset and preventing water ingress into its fabric, and its interior in the case of enclosed buildings and structures. This might include for example: the use of temporary, short-life materials such as lead substitutes for valleys and gutters; mineral felt over areas of missing slate; temporary protection and capping of wall heads; areas of wall core and face consolidation in ancient monuments. Abbreviated details may be appropriate, such as the use of simplified rhones or downpipes. Prevention may also include the boarding of windows and other openings on exposed elevations.

3. **Improve security.** This is likely to involve the securing of doors and window openings with particle board; steel is only to be used in areas of extreme risk. Where there is sensitive or fragile material, such as window frames, boarding should be fixed in place using timber wedges. Where there is less significant material, standard fastenings such as security screws into existing timber surrounds, jambs or window frames may be suitable. Fixing into masonry with nail guns or other penetrating devices causes long term damage and is not advised.

4. **Maximise ventilation.** Any interim measures should ensure that ventilation is maintained, or even in the cases of saturation, enhanced. Timber decay is significantly inhibited if bulk air movement is maximised within reason. In buildings, consider ventilation using open hearths and flues, and/or gaps at the tops of windows. Other structures may require bespoke arrangements.

5. **Minimise adjacent risks**. Works must also consider adjacent areas of hazard to the asset. This might include for example: a lack of, or defective ground drainage; surface water run off or pluvial flooding; inadequate ground conditions; dangerous trees close by, or flammable materials stacked nearby.

2.5 Temporary protective works

Where temporary structures are put in place, such as temporary covers, scaffolding or shoring, consideration must be given to their ongoing hire and maintenance costs, and monitoring for security and safety. This will likely incur ongoing costs and possibly the requirement of a temporary works coordinator or similar competent professional. Grant-eligible costs may include design (e.g., relevant professional fees), installation and subsequent maintenance costs of temporary structures for an agreed period.

2.6 Removal of temporary interim works

Where the interim works are of a temporary nature, consider at the design stage methods for, and timing of, the removal of any temporary interim works and compatibility with the final design.

SECTION 3: REPAIR WORK TO BUILDINGS

The following items relate to fabric repair of buildings generally (not ancient monuments) and will in most cases be grant-eligible unless stated otherwise. Our decisions on eligibility for each project will be assessed and set out in principle in our TAR1 report where you have applied and been successful to our Historic Environment Grants (HEG) Programme.

Repair can include a variety of conservation techniques as well as careful replacement of material which is decayed and is no longer functioning. If required and appropriate, replacement works should use the same traditional materials, if possible, or ones with very similar properties and characteristics. For example, localised timber repairs to a historic window rather than full scale renewal of a sash or entire window. Repair can on occasion include renewal and replacement of materials and elements when they have reached the end of their functional lifespan and retention would place the asset at risk.

Reinstatement is the restoration of lost or destroyed elements of a building or other structure. Our grants do not cover reinstatement except in some specific circumstances. Reinstatement works should represent efficient use of our funding and not be solely based on aesthetic reasons. We may consider grant for reinstatement where it is essential to protect historic fabric and/or where there is a structural need. Reinstatements may have environmental resilience benefits such as reinstatement of lost copes or chimneys, and where poor-quality repairs or alterations in the past are having a detrimental effect on the fabric of the building. Where a building has largely kept the integrity of its design, the reinstatement of lost elements of the design may be grant-eligible. In each case the potential architectural gain will be balanced against any likely loss of historic integrity. Whilst we do not grant-aid speculative reinstatement based solely on aesthetic reasons, we can for example consider reinstatement of shopfronts where there will be wider economic, place making and community benefits.

3.1 Scaffolding

3.1.1 Scaffold design

1. Design proposals for scaffold should aim to minimise any added load onto a historic structure or fixings into historic fabric.

2. When bracing scaffolding, avoid the use of damaging masonry anchors. Consider the use of 'free-standing 'scaffold or self-supporting scaffold with kentledge, and make use of window openings, window jamb cramps, raking support, or fixing into mortar joints that are sufficiently wide to prevent damage to adjacent stone arisses.

3.1.2 Scaffold fixings

1. A strategy for the insertion and removal of fixings should be devised before scaffold is erected.

2. If anchors are required, they must not be fixed close to edges of carved decorative features.

3. Expanded ferrous anchor sockets left in masonry will cause staining and cracking as they rust and must be removed at the end of the work. Consider rubber sleeved anchors which can be more easily withdrawn on completion of the works.

3.2 Roof

3.2.1 Roof structure

1. Ensure the roof structure is sound. Where there are significant signs of movement in the roof structure, advice from a structural engineer experienced in the repair of historic structures may be required. When designing remedial structural repairs, adopt a minimum intervention approach.

2. Understand the original roof build-up and design the repair to suit the site circumstances. Consider if the use of modern breather membrane is necessary as it may compromise ventilation and cause the requirement for additional purpose-designed ventilation to the roof construction and roof space. Dark coloured membrane should be used where it would be visible at completion of works.

3. Clear sarking of old nails and lift the lowest sarking boards to inspect the rafter ends and the wall plate. Where new sarking is required use butt jointed boards set with small gaps to permit ventilation.

4. Inspect timbers for rot, insect attack and structural weakness. Repair damaged timbers using new preservative treated timbers run to the original profile and treat rot or insect attack locally as required. Refer to the **Section 3.6: Rot & insect attack works** section.

5. Timber repairs should be spliced in-line rather than cheek bolted where appropriate to the structural design and the historic significance of the roof. Refer to **Section 3.14.2: Internal joinery work repairs** for more information.

3.2.2 Roof ventilation

1. Check there is adequate provision of ventilation to roof voids, in both pitched and flat roof constructions. Consider the risks of condensation, damp, and rot from both warm and cold roof constructions. Ensure natural ventilation and maintain traditional details. Where practicable allow for free ventilation to timber rafter ends and wall plates.

2. If additional ventilation is proposed for the roof void, a case should be provided as to the reason/defect this is addressing. It should be based on building precedent wherever possible, located discreetly, and constructed using traditional materials e.g., lead. Bespoke solutions, rather than standard modern products, may be required.

3. Ensuring adequate passive ventilation to the building as a whole may assist in climate mitigation. This could include repair, reinstatement or introduction of traditional cupolas, roof, and skylights. As above, this should be based on building precedent wherever possible, and constructed using traditional materials. Repair of existing features will always be prioritised, followed by reinstatement based on building evidence, with newly designed works only where necessary. The passive ventilation strategy for the building should be clear, and may include other works to underfloor vents, chimney flues, etc.

3.2.3 Roof slating

1. Where different types of slate have been used across building phases, or ranges, as part of the building's natural evolution, these characteristics are to be respected.

2. Re-slate using sound original slates recovered from the site, together with matching slates brought in to make up the required number.

3. Slates to be laid to exactly match the original laying pattern using slates of the same shape as the originals. This includes the number of courses and their sizing. A survey record of the original slating may be required.

4. Re-used slates should not be re-dressed as a matter of routine.

5. Slates should be fixed with non-ferrous nails of appropriate lengths to suit the roof details.

6. Replacement lead flashings, secret gutters, ridges and other weatherings to be lead as described in Roof: Leadwork.

7. Mortar fillets at skews may be reinforced with expanded non-ferrous metal reinforcing lath and formed on top of code 4 lead soakers.

8. Where there is heavy moss growth it may be beneficial to consider the addition of copper strip.

3.2.4 Stone slab roofing

1. Record existing stone slab slating noting course heights, lap, and peg fixing.

2. Retaining all viable original fabric, re-grade slabs and make up differences in new stone slabs which match the source, colour and texture of the original, respecting original peg and fixing details.

3. Re-fix using newly made seasoned timber pegs of matching species (traditionally oak).

3.2.5 Fired clay roof tiles

1. Tiled roofs are normally laid on timber battens and counter battens (over roofing felt). Understand the original roof construction, batten sizes and configuration, and repair the timber substructure to match

including any requirements for replacement of the roofing felt as appropriate.

2. Replace broken or unsound tiles with new tiles of the same material, colour, profile, size, and glaze (if relevant).

3.2.6 Leadwork

1. Consideration should be to be given to the retention and value of historic leadwork. Life expired and un-repairable weatherings and lead flat roofs should be renewed in new milled or cast lead to the codes set out below. Please note some of these codes may be higher than the minimum codes in the Lead Sheet Training Academy's Rolled Lead Sheet – The Complete Manual, for grant-aid purposes.

   - cupola astragal and rooflight cover flashings to be a min. code 5.
   - flashings, secret gutters, dormer cheeks etc. to be a min. code 6.
   - valleys to be a min. code 7.
   - short gutters or small areas of flat roofs without foot traffic to be a min. code 7.
   - all other flat roofs or gutters to be a min. code 8.
   - ridges to be a min. code 8, and fixed with clips of min. code 8 lead, or terne-coated stainless steel.

2. Lead to be laid to follow the recommendations of the Lead Sheet Training Academy but also with respect of the original leadwork aesthetic. Complex and details unique to the building should be drawn at a large scale sufficient to illustrate how these areas are to be constructed.

3. Where renewal of 'flat 'lead roofs and parapet gutters is required, take the opportunity to assess the historic design of falls and outlets. Sensitive reworking of the substructure, and considered detailing of any abutting primary structure, may be required.

4. Flashings are to be inserted into raggles sufficiently sized to allow the raggle to be pointed with lime mortar. Typically, the raggle would be a minimum of 12-15mm wide, its depth twice the width of the raggle, or a minimum of 25mm, and square cut. Existing raggles should be used wherever possible. Lead should be isolated from lime mortar by a protective coating such as masking tape or bituminous paint.

5. The use of lead sacrificial flashings and weatherings is encouraged. For example, where slating discharges into valleys and parapet gutters; or inserting lead drips to copes and stone ledges. This enhancement of detailing can also be considered to mitigate any relevant climate impacts which are affecting the building fabric.

6. On flat roofs, hollow roll joints should not automatically be replaced with wood cored roll joints, consideration should be given to the historical context, the roof pitch, and any likely foot traffic.

7. Discreet dating of new repair work may be considered.

3.2.7 Other metal roofs

1. Repairs to zinc and copper roofs should replace metal trays by closely matching the original overall appearance but with details, gauge of metal sheet and underfelt as recommended by the International Zinc Association (IZA) or Copper Development Association (CDA) as applicable.

2. Where it is agreed that original zinc or copper roofing is to be replaced by lead, detailing should be as recommended by the Lead Sheet Training Academy and HES requirements listed in **Roof: Leadwork**.

3. Repairs to corrugated iron roofing, or wall cladding, should be with galvanised corrugated iron to the original profile and thickness and using fixings to match the original. Modern HEX type screw fixings would not be grant-eligible. Corrugated iron to have a suitably specified rust inhibiting primer and paint finish.

3.2.8 Security of metals

1. Consider appropriate deterrents methods where metal theft is a risk, for example alarms, anti-climb paint, security, or forensic marking such as SmartWater. Some methods may be grant-eligible.

2. Where metal theft deterrent measures are not appropriate or sufficient, additional securing methods may be needed.

3. In exceptional cases, for example in areas of repeated theft, the use of a substitute material may be considered eligible for grant. Substitutes could include other metals (zinc, stainless steel), single ply membranes or felt. The general appearance of the substitute material should follow the original detailing as closely as possible. Some materials may be grant-eligible.

4. Refer to HES Short Guide: Lead Theft – Guidance on Protecting Traditional Buildings for further information.

3.2.9 Asphalt roofs

1. Where an asphalt roof covering is damaged and leaking this should be lifted and replaced with new asphalt laid in coats strictly in accordance with the instructions of The Mastic Asphalt Council. A sand dusted surface is preferred.

2. Lead over-flashings are to be detailed in accordance with the recommendations of the Lead Sheet Training Academy.

3.2.10 Bitumen felt roof covering

1. Where bitumen felt roof covering was the original and historically correct roof covering on a flat roof, it can be renewed to match

existing. Perimeter details should remain broadly the same as for the felt original.

2. Bitumen felt will not be considered as grant-eligible as a replacement for roofs that were originally finished in lead, zinc, copper, or mastic asphalt.

3.2.11 Thatch

1. There are many types of thatch and thatching techniques in Scotland and these roofs are now a scarce and highly valued historic resource. A Survey of Thatched Buildings in Scotland provides further information.

2. Maintenance of thatch extends its life and would have been standard practice traditionally, reducing the frequency at which a complete re-thatch was necessary. Maintaining and repairing traditional thatched roofs requires the most careful investigation and consideration.

3. Research for archival visual or photographic evidence of the building and its thatched roof will be necessary before works are proposed. This may help establish its thatch type and any detail including to use of cabers.

4. A record of the roof should be made including its primary and secondary roof structures and connections, the thatch type, substratum, fixings, and cabers.

5. Archaeological trenching through the thatch may help to provide invaluable information on the make-up of the roof and allow the sources of the thatch materials, including substratum layers, to be identified. Substratum usually consists to turf/straw underlayers.

6. The aim of the grant funding is to encourage the maintenance of types of thatch which are traditional to their local area. Consider if the proposed thatch matches the historic one, and if not, has every effort been made to source the matching type. If the historic type of thatch is not available, then the proposed type of thatch must be the closest match possible (type and geography).

7. Many thatches survive as an insulation layer under corrugated iron roofs. Existing corrugated iron on thatch should always be retained unless there is an exceptional reason not to do so. Repair of corrugated iron that is currently protecting thatch is grant- eligible. Refer to **Section 3.2.7: Other Metal Roofs**.

8. Proposals for the repair of traditional thatched roofs should follow the original as far as possible and include repair or replacement as appropriate of the roof structure, substratum, fixings, and thatch.

9. Where a matching material is not in season, temporary protection may be beneficial for a vulnerable thatched roof prior to works

commencing the following season. Temporary protection will be considered when part of a wider project, and its design and materials on a case-by-case basis.

10. Refer to HES Technical Advice Note 04: Thatch and Thatching Techniques and HES Technical Advice Note 13: The Archaeology of Scottish Thatch for further information.

3.2.12 Skylights/ Ventilators

1. Original cast iron skylights should be repaired and re-used rather than replaced.
2. Original cast iron and sheet metal roof ventilators should be retained and overhauled, or replicated where beyond repair.
3. Where replacement rooflights are required, replace with new rooflights to the same size, detail, and materials. Incorporation of thermal break alloy castings is acceptable.
4. Cast iron skylight and ventilator elements are to be painted as outlined for **Rainwater Disposal**.
5. Zinc and copper sheet metal should be painted or left as self-finish as appropriate to building.

3.2.13 Safe access

1. A strategy for maintenance beyond the completion of the works should be considered, and most projects in receipt of £25,000 or more of grant-aid will be required to produce a maintenance plan.
2. The opportunity should be taken to consider if there is adequate safe access for future repair and maintenance, and if not, can appropriately designed access be introduced. Refer **to Section 4: Ancillary works to buildings**.
3. Where existing original features provide access, e.g., roof hatches, their safe continued use should be assessed, and repair undertaken as applicable.

3.3 Chimney stacks and flues

1. Ensure the fabric of the external chimney stack and roof flashings are in good repair.
2. Missing or defective chimney pots to be replaced to match the original form indicated by documentary or site evidence. Where there is no evidence of the original, use pots to match the pattern in use on buildings of a similar period in the vicinity.
3. Ensure that the number of pots accurately reflects the number of flues and where appropriate reflects historical variation in types used on the respective flues.

4. Mortar haunching of chimney pots should be specified which is suitable for the adjacent masonry, for example hydraulic lime mortars. Consider reinforcement using stainless steel mesh if required.

5. Chimney flue ventilation should be retained or reinstated where possible.

6. Retaining open fireplaces can be beneficial as part of a passive ventilation strategy. Consider the reopening of covered/ blocked chimney flues and reinstatement of dampers on hearths and insets. Whilst the repair of a damaged flue would be eligible for grant, the insertion of a flue liner would not be eligible. The pouring of cement down the sides of a liner to consolidate a flue, using the liner as form work, is also not eligible.

7. Chimney flues not in use should be cleared of debris and then terminated with a vented weathered top and a vent at the bottom of the flue to allow free air circulation.

3.4 Rainwater disposal and ground water management

3.4.1 Rainwater disposal

1. Check that the existing rainwater goods are adequate to control and discharge rainwater safely away from the building, particularly in respect of increased risk of extreme weather events.

2. Ensure that any perceived lack of capacity is not related to other defects such as poor later works, additions to the design, or a lack of repair and maintenance.

3. Review the overall size and cross section of gutters, outlets and hoppers, and the location, number and size of overflows and downpipes. Ensure that there is maintenance access at ground level and at key junction points above.

4. If the rainwater disposal system is felt to be inadequate, the Professional Adviser should submit their drainage capacity calculations and proposals for reconfiguration of the existing installations. Consider the effect to the building appearance of any proposed functional improvements to rainwater fittings.

5. In the case of historic lead lined parapet gutters, pay particularly attention to under sizing of upstands, drips, roll cover laps, lack of adequate surge pits and overflows. Repair may often require a substantial reworking of the associated supporting substructures and considered detailing around the primary roof structures.

6. Where rainwater disposal elements are broken, damaged or missing, or in non-original materials such as uPVC, replace to match the original material e.g., cast iron, zinc, or lead. Either match sizes to

original profile and detail, if design is adequate, or as agreed if design is to be altered.

7. The addition of trace heating may be considered in particularly problematic or inaccessible areas. Refer **Section 4: Ancillary works to buildings**.

8. All cast-iron pipework and rhones to be prepared, primed, and painted using a high-performance paint specification. Paint new cast iron goods before site assembly and make good joints, chips, and fixings immediately after fixing. Particular attention should be given to preparation and paintwork at sharp arrises to fresh castings. The final colour may be selected using evidence gained in the repair process, or to match the background fabric.

9. On completion of the works, ensure that the rainwater disposal system is clear and flowing freely.

10. The project 'as built 'information should include plans and methods of access to all drain routes and pipe runs that require maintenance.

3.4.2 Below ground drainage

1. Below ground drainage to be checked, recorded, and made fully operational to ensure rainwater is being conducted properly away from the building and its immediate vicinity.

2. Consider any consequent changes required to existing below ground drainage systems, including soakaways to the surrounding landscape drainage, where the current system is assessed to be inadequate. This should form part of the overall review of the rainwater disposal system.

3. Any proposed groundworks, including investigations, within sensitive areas may require an archaeologist. Refer to **Section 1: Project development.**

3.4.3 External drainage and groundwater

1. Assess existing external drainage around the building perimeter and its effectiveness. Consider if the drainage system can cope with potential heavier rainfall events or if problems have occurred.

2. Consider any relevant drainage issues beyond the immediate building footprint, such as sloping ground or poorly drained hard surfaces.

3. If improvements to external drainage are felt to be required, the Professional Adviser should submit the evidence of need and their proposals. This may include a number of strategies such as reducing /re-establishing appropriate ground levels adjacent to the building; encouraging free-drainage using granular surfaces beside walls / reducing hard surfaces next to walls; introduction of below ground permeable pipe drainage.

4. Any new measures must, as applicable, include structural assessment to ensure no undermining of foundations, or risk to the building's stability; archaeological investigation; and be appropriate in terms of the visual impact and cultural significance of the building and its immediate surroundings.

5. Where intermittent or flood surge ground water is experienced, consider local intervention measures at vulnerable areas such as entrances, and the use of sump pumps. Alarm detection can be considered for difficult to access areas where there is a significant risk to building structure and historic interiors.

3.5 Damp conditions

1. Damp environmental conditions can cause significant damage to building materials and structure, and it is important to understand the source of the water, or condensation, when considering appropriate actions and treatment.

2. Appropriate measures to manage rising or penetrating damp, which cannot be mitigated by other means (for example work to **External Drainage**), and is damaging the fabric of the building, may be grant-eligible.

3. Use of cement or bitumen-based renders and surface applied tanking is not recommended or grant-eligible. Reversible membranes which allow the historic masonry to breathe may be grant-eligible in some cases for below ground historic masonry, if dealing with a fabric defect. These are not grant-eligible when their sole purpose is to make previously non-habitable space usable.

4. Avoid the introduction of impermeable solid floor construction at ground level which can increase the risk of water ingress and rising damp to adjacent walls.

5. Replacement of impervious solid floor constructions and materials or coatings to walls at and below ground level with permeable alternatives, such as lime-based products, may be grant-eligible in some cases.

6. Review the existing provision to adequately ventilate the building fabric to the underside of the ground floor construction. Ensure air movement around timber joist ends and sole plates. Where original vents exist ensure these are functioning.

7. If no ventilation is present, and/or felt to be inadequate, the Professional Adviser should submit the evidence of need and their proposals for improvements to under floor ventilation. Consider the effect to the building appearance of any proposed functional improvements to under floor ventilation.

8. Appropriate DPCs may be considered for situations such as separation of roofing timbers from masonry, or under copes, with due consideration of how to avoid slip planes.

9. Installation of a new chemical DPC is not recommended or grant-eligible.

3.6 Rot and insect attack works

1. Identify the cause of the rot or insect attack, such as a defect causing moisture to penetrate the fabric and rectify the defect. Where time permits, allow the fabric to dry out.

2. Where the defect cannot be rectified, take suitable measures to control the cause, and monitor the situation, to reduce the risk of reoccurrence.

3. Seek independent expert advice on methods of treatment, adopting a conservative approach including environmental controls and with green principles wherever possible.

4. Seek the advice of a suitably experienced structural engineer on decayed structural timber sections and repair requirements.

5. Carefully patch in new pre-treated structural timbers to match original.

6. The making good of internal finishes to match the original where these have been damaged to allow for the opening up for structural repairs will be grant-eligible, including secondary rooms. Any general repair/redecoration of historic linings to secondary rooms would not be grant-eligible. Refer to **Section 3.14: Internal Works**.

3.7 Masonry

3.7.1 Structural condition

1. Where significant structural movement, settlement cracking or other evidence of a compromised structure is identified, advice from a structural engineer experienced in the repair of historic structures may be required.

3.7.2 Removal of moss and algae from masonry

1. Where damp conditions have caused moss and algal growth on masonry, the area is to be scraped clean with wooden spatulas and cleaned down to remove all organic debris and soil prior to re-pointing. The source of moisture encouraging such growth must be addressed to prevent re-growth.

2. Seek specialist advice on biological growths such as algae, fungi, and lichens where the effect to the masonry may not be benign but removal could cause masonry damage.

3. It should be recognised, that biocide is unlikely to have a long-lasting effect and may damage the masonry. Consequently, the use of biocide is not grant-eligible.

3.7.3 Removal of vegetation from masonry and immediate vicinity

1. Consider the proximity of large and mature trees and the risk and likelihood of damage to historic fabric from root heave or fall, including affected foundations and drainage.

2. Carefully remove any invasive vegetation while avoiding damage to the masonry. Treat with suitable systemic weed killer.

3. Stones that are found to be loose are to be held in place by wooden wedges and suitably propped as required until repair work is undertaken.

3.7.4 Masonry repair

1. Proposed masonry repair works should be prepared, for example using marked up elevational drawings or photographs. Further detailed assessment can be made once the scaffolding is in place. Investigation may include brushing down loose stone (with bristle brushes, not wire) and tapping the existing surface to ensure the face of the stone is sound.

2. Where the stone face is eroded or crumbly, but this does not pose a threat to the weathering function (e.g., cills), the structural integrity, or the architectural interpretation of the building, it is advisable to leave for attention at some time in the future.

3. Where soft, cracked, or friable stones are identified as a threat to the structure or weathering, or significantly detracting from the architectural composition and integrity of the building, they may be carefully cut out and indented with a matching stone that respects the existing stone joint pattern.

4. Where it is necessary to replace missing, broken, cracked or eroded stones with new stone, ensure that the new stone is a suitable replacement for the original in terms of colour, texture, porosity, crushing strength and weathering properties. Analysis services and advice on suitable new stone to match existing can be obtained from specialists including British Geological Survey. We ask that analysis data is provided to HES in a format that can be imported into the Building Stone Database for Scotland where possible.

5. Remove any redundant fixings, surface-mounted cables, television aerials and extraneous ferramenta, including redundant drainage branch pipework. Repair any damage appropriately. Where services cables or aerials are required, site and route these discreetly.

6. Exposed surfaces of new stone should be hand dressed to match the original face or tooling. Avoid the use of power tools on any exposed

surface of stone. New stones should be oversized to allow for hand-dressing of exposed surfaces prior to tooling i.e., avoid droving or broaching a polished/sawn surface. Cut replacement stone on the correct geological bed for the circumstances of its use in different elements of the building.

7. Indented face stone should have a minimum bed depth of 150mm and extend to the full face of the stone in most cases.

8. New stone should not be distressed or toned down to match the original.

9. The use of pre-mixed restoration mortars in repair work is not recommended and would not be grant-eligible. Mortar made from lime, sand and graded matching stone, may be acceptable for fine cracks or small pocket repairs in otherwise sound stone, and where lying water and subsequent frost damage may be considered a risk. Use of proprietary restoration mortars in exceptional cases for damaged masonry may be acceptable. Refer to **Section 3.7.5: Damaged Masonry.**

10. Do not point open joints which were originally dry built.

3.7.5 Damaged masonry

1. The use of alternative or modern materials and techniques to repair damaged masonry can be appropriate in certain circumstances.

2. Very fine detailed repair will require the input of a specialist stone conservator and preparation of a conservation report.

3. Specialist stone conservator techniques and materials such as acrylic resins can be considered for delaminating, fissured, and cracked masonry and sculpture work. This type of work with acrylic resin will have a limited life and implies on-going condition monitoring.

4. Limited and localised use of proprietary restoration mortars may be appropriate for small key areas to retain building significance, extensive use is not appropriate.

5. Consider the composition of the restoration mortar and the compatibility with the masonry, as a difference in breathability will exacerbate erosion and loss of the masonry.

3.7.6 Removal of cementitious pointing

1. It is often better to avoid removing sound cementitious pointing as it can be damaging to the adjacent stone arrises to remove well-adhered cement mortar.

2. Where pointing is cracked and open, separating from the stone, or causing evident distress and erosion to adjacent masonry, carefully remove cementitious mortar using fine masonry chisels. The expert

use of appropriate power tools to assist may only be considered in strictly controlled situations.

3. Pointing should be raked out to a minimum depth of 35mm and the joint flushed clean.

3.7.7 Joints in ashlar masonry

1. Where ashlar masonry is quite tight with few open joints, avoid re-pointing this masonry.

2. Re-point open ashlar joints by raking out loose or crumbly mortar by hand with bespoke tools and hose joints clean. The expert use of appropriate power tools to assist may only be considered in strictly controlled situations.

3. Wet joints and re-point using lime mortar with suitably sized fine aggregate, and colour to match original.

4. Protect ashlar to avoid staining.

5. Protect pointing while it is curing in accordance with best practice.

3.7.8 Joints in rubble masonry

1. Joints in rubble masonry should be finished to match the original pointing style of the masonry wall. Evidence on the building and/or photographic evidence should inform specification prior to works on site. This may include flush pointing, lining out of pointing and other finishing styles. Refer to HES Technical Paper 33: Masonry Pointing and Joint Finishing for further information.

2. Where mortar joints in rubble masonry are loose or crumbly, carefully rake out to a minimum depth of 35mm using fine masonry chisels narrower than the joint to avoid damaging the stone.

3. Thoroughly flush clean the joint and re-point with the mortar mix informed by analysis. Refer to **Section 3.7.9: Lime mortars for building and pointing**.

4. Pointing to be well packed into the joint and where appropriate, incorporate pinning stones. Use the correct number, size, shape, orientation, and type of pinning stones to maintain the mortar/stone ratio, and original character of the wall evident in the original build.

3.7.9 Lime mortars for building and pointing

1. Lime mortars have significantly different working properties to cement mortars. Cementitious products, or inclusion of cementitious materials in lime mortar mixes, is not grant-eligible, except where there is historic precedent.

2. Advice on procedures and suitable mixes may be required and can be obtained from various specialist consultants.

3. Lime mortar specifications for repair should be informed by the existing. However, technical analysis of a historic mortar for a new specification can be ambiguous, given leeching of lime, and other decay mechanisms. It is also unlikely that a single mix prevailed through a large site. Nevertheless, mortar analysis will inform on matters of aggregate and additives. Visual mortar analysis can help understand the phasing of a historic building and identify where historic mortars survive. Consideration should be given to matching the various phases and retaining areas of surviving historic mortars where this adds to a building's character and will not undermine the overall conservation work.

4. Repair mortar specifications may include Natural Hydraulic Lime (NHL), 'hot' lime or gauged mixes. More than one specification may be required depending on the work required, its location and function.

5. Mortar specification for repairs should not adversely affect the weathering of adjacent masonry.

6. Ensure lime mortar work is undertaken in appropriate weather conditions and protected from sun, rain, and frost until cured in accordance with best practice.

7. In some cases, management may include elongated project timescales to allow for protection to be left in situ once works are completed. Protection and aftercare should form part of a method statement for lime work.

8. Quality and appearance of work to be determined and agreed by sample panels.

3.7.10 Earth mortars

1. Earth mortar exists in some early or rural buildings. Care should be taken to identify, analyse and carefully reproduce where repair is required.

3.7.11 Grouting

1. Where structures have been subjected to continual saturation and consequent loss of binder from the wall core, gravity grouting with an appropriate lime-based mix may be required to ensure the structural integrity of the wall core and the masonry skins.

2. Grout should not be fed under pressure and measures must be taken to prevent staining.

3. Grout specification and a detailed methodology should be prepared.

3.7.12 Brick

1. Note the character of the original brickwork including bond, brick type, sizes, and mortar pointing profile.

2. Survey and record location of, and types of decay to inform repairs required.

3. All brickwork repairs to accurately follow the original build, using brick of accurately matching colour, size, hardness, and porosity.

4. Following brickwork repair, re-point to match original using a pointing tool and application technique similar to that used originally with a mortar specification to suit the age of the building and the strength of the brick.

3.7.13 Concrete

1. Commission an independent investigative specialist report on the condition of the concrete and repair the structure accordingly. The report should include such techniques as use of a cover-meter to establish the depth of reinforcement cover and include core samples at strategic locations to enable analysis of the depth of carbonation, chloride content and quality of concrete.

2. Remedial works may include specialist treatment to enable retention of as much original fabric as possible.

3. Repair of concrete should replicate original shuttering patterns or similar surface textures.

4. The use of proprietary repair concrete mixes is common in the concrete repair sector and depending on the age of the structure may be suitable for use on historic concrete structures.

5. Many failures and decay of concrete structures. are a result of poor detailing; increased rainfall may require new detailing designs that do not excessively affect the architecture of the structure.

3.7.14 Lime harl/ Render

1. Site operations should ensure that flashings, rainwater goods and external joinery are fitted at the appropriate time to ensure a good finish to the harl/render.

2. Harl or render coats should be applied in accordance with traditional techniques. For harling, modern spray-gun applications can be considered in some cases, however as a minimum the final coat must be hand-cast (thrown). The new harl should replicate any local traditions.

3. Where a lined-out ashlar appearance is to be made, the surface should be pressed flat, and the lining out undertaken to a pre-determined pattern of joints. The ruling tool is to be appropriately shaped to provide lines of the correct depth, consistency, and cross-section.

4. Specifications should be designed following technical analysis of the original harl. This should identify the various constituents e.g., shell, aggregate, lime proportions etc.

5. Quality and appearance of work to be determined and agreed by sample panels.

6. Harling should be screened from rapid drying in accordance with best practice. Where the harling is exposed to drying winds or temperature, repeated wetting of the screens will be necessary.

7. Cementitious products, or inclusion of cementitious materials in lime harl mixes, is not grant-eligible, except where there is historic precedent.

8. Re-instatement of traditional harl or renders to improve the climate resilience of the masonry and energy efficiency of the external fabric may be considered. Reinstatement will require careful consideration, research, and technical analysis (where coatings remain) to establish the original harl or render composition, appearance and colour. This should inform a strategy for reinstatement. Note that introducing harl or render to a building where there is no historic precedent would not be recommended or grant-eligible.

3.7.15 Limewash

1. Specifications should be designed following technical analysis of the original limewash (if possible). Historic limewash can have several constituents ranging from natural pigments, tallow, and other organic additives. Where evidence of original / historic limewash is not present, proposals based on similar buildings, local area traditions etc. should be provided.

2. Quality and appearance of work to be determined and agreed by sample panels.

3. Limewash should be applied by brush in multiple coats, usually a minimum of eight coats, each coat sufficiently thin (usually the consistency of skimmed milk) to allow its carbonation. Burnishing coats may be applicable.

4. Limewash should be screened from rapid drying in accordance with best practice. Layers of limewash should not be applied if the appropriate attendance to control rapid drying is not possible.

5. Where the limewash is exposed to drying winds or temperature, repeated wetting of the screens will be necessary.

3.8 Cleaning and removal of finishes from masonry

3.8.1 Cleaning masonry

1. Cleaning masonry for purely aesthetic purposes is not advised and not grant-eligible. The historic patina of masonry should be retained. In exceptional cases, listed below, removal of surface coatings may be necessary and eligible for grant as part of a repair process.

2. Any removal must be informed by agreed method statements and sample test panels.

3. Consider the newly exposed masonry condition and appearance. In some cases, the masonry may require repair and/or a new applied finish such as lime paint, limewash and/or a lime harl/render.

3.8.2 Removal of graffiti from masonry

1. There are different methods to remove graffiti resulting from vandalism. It is necessary to analyse the paint, dye, or ink type to establish the least damaging removal method.

2. Removal of markings should be tested and agreed for use on that particular stone type before approval to proceed is given.

3. Chemicals used on stone are to be neutralised immediately after use.

3.8.3 Removal of paint and other coatings and facings from masonry

1. Removal of coatings and later applied finishes (e.g., tiles, brick slips) may be necessary and grant-eligible where there is evidence of distress to the underlying masonry, or where the finish may be considered incongruous and detrimental to the building significance.

2. Analyse the paint, coating, or other finish to establish the least damaging removal method.

3. Removal should be tested and agreed for use on the particular masonry type before approval to proceed is given. Gels, chemical poultice systems or air/water abrasion may be appropriate. Test the proposed system as a control sample for approval to proceed, particularly where chemical poultice or low-level air/water abrasion is proposed.

4. Chemicals used on stone are to be neutralised immediately after use.

3.9 External carpentry and joinery

3.9.1 Repairs to timber cladding and external finishing and architectural joinery

1. Retain as much original material as possible.

2. Replace rotted sections, with timber to match species, visible grain characteristics, quality and colour, suitably treated for the location.

3. New sections are to match the profile of the original with fixings to match existing.

4. Reinstatement of missing sections and elements may be necessary and grant-eligible where supporting historical documentary evidence is available.

3.9.2 Treatment and finish

1. Timber cladding and weatherboarding may be left to weather where this is the original finish.

2. Treatment and finish to external carpentry and joinery such as cupolas, fleches, balustrades, louvres, porches, barge, and eaves boards, should match that evident on the original fabric or, if not feasible, should be based on research and historical documentary evidence if available.

3. Products and systems selected for treatment and finish should be appropriate for the location. At exposed and inaccessible areas, high performance oil treatment and non-traditional paint systems may be applicable.

4. Modern protective wood stains are not recommended or grant-eligible.

3.10 Window and door joinery

3.10.1 General repairs

1. Carry out repairs to windows and doors sensitively retaining the original fabric in preference to replacement where possible.

2. Repair wherever possible should be by splicing in matching timber (new or salvaged), to follow accurately the original profile using traditional techniques and suitable proprietary wood glues.

3. Windows and doors should be overhauled to ensure that they are operable as per their original design. Windows should be openable for ventilation, cleaning, and maintenance on completion. They should not be sealed shut useless this was the original design intent.

4. Where trickle ventilation is found to be required to aid room ventilation this must be discrete and designed appropriately for agreement.

5. Refer to HES Short Guide: Sash and Case Windows for further information.

3.10.2 Replacement and reinstatement of windows and doors

1. Replacement window sashes, full windows, and doors may be considered grant-eligible where windows can be evidenced to be beyond repair.

2. Reinstatement of traditional windows and doors may be considered grant-eligible where later unsympathetic and inappropriate alterations exist, and / or where windows or doors have been lost.

3. Where replacements are required they should be manufactured from timber sections which accurately match the original, or an earlier, design and its profiles.

4. Where replacement windows or doors are required, careful consideration should be given to whether any glazing should be single or double-glazed. Considerations may include: the number of replacements; the impact of double-glazing on the appearance of the building or area; its impact on original design and detailing, e.g., timber window profiles; and the longevity of products.

5. Where appropriate, new glazing may be double-glazed units, in which case the specification of the glazing units must be carefully considered to suit the design and dimensions of the original joinery (frame, astragals etc.). It will be most likely to be vacuum or narrow profile glazing and may incorporate gas fill units and/or low emissivity glass to increase the energy efficiency performance, retain interior heat and reflect solar heat gain. Modern putty glazing compound may need to substitute traditional putty.

6. Refer to HES Managing Change in the Historic Environment: Windows for further information.

3.10.3 Ironmongery

1. Retain and reuse original ironmongery wherever possible. Where necessary select historically appropriate new ironmongery that meets the modern requirements of security, exit, and cleaning, yet is of an appropriate style and quality.

2. Use only slot headed screws of the correct type to match original installation.

3.10.4 Recessed draught-proofing

1. Existing windows and doors may be thermally improved by inserting recessed draught-proofing. Consideration should be given to the significant of the original joinery and any associated ironmongery.

3.10.5 Metal windows and doors

1. Retain and repair as much original frame, operating gear, and ironmongery for re-use as possible.

2. Replace damaged sections, to match section and profile.

3. Where repair is not possible, replace to replicate size, profile, and finish.

3.10.6 Abutment pointing

1. The joint between joinery and masonry is to be pointed with either of the following: a traditional site mixed mastic comprising burnt mastic sand and boiled linseed oil placed against a suitable backing stop; or lime mortar pointing placed against a suitable backing stop.

2. Where a building is harled/rendered the use of lime mortar to fill this joint will allow the harl/render to be brought up to the joinery. This should be placed after joinery fascias have been decorated to ensure good protection of the fascia.

3. For metal windows that are a feature of the original design, alternative mastics may be agreed.

3.10.7 External painting of window and door joinery

1. Paint using traditional methods prior to assembly of sections where possible. Use good quality oil-based paint preparation including knotting preparation treatment. Particular attention should be given to rounding sharp arisses to avoid thinning of paint.

2. Ensure paint is not spread onto adjacent masonry.

3. Appropriate window colour is to be agreed; choice can be informed by paint analysis. Off white (avoid brilliant white on pre 1920s buildings) or other colours such as black or green, following historic local practice may be appropriate.

3.10.8 External painting of metal windows and doors

1. Generally as for **Section 3.10.7** with specialist preparation, and coatings as required.

3.11 Glazing

3.11.1 Existing glazing frames

1. Where the existing window or glazing frames are considered appropriate to the building these should be retained.

3.11.2 Original glass

1. Original and historic glass (crown, cylinder, plate, drawn, patterned or coloured glass or glass with seeds, reams or other notable impurities) should be retained in-situ, and where this is not possible should be put aside for later reinstatement.

2. The use of a proprietary putty lamp can be valuable in removing old putty without damaging the glass.

3.11.3 Repair of single glazing

1. Where it is necessary to replace existing glass panes in an original window or door, consider the best match to original glass examples on site or to the date of the building's construction. These may vary on a single building or elevation. Any patterns established as a result of evolution of the building should be respected.

2. Glass options should be appropriate to the building's appearance considering colour, tone, and light reflectance.

3. Modern cylinder, Vauxhall, crown, float glass or horticultural glass may be used for replacements depending on the original glass type.

4. Repair of glass in-situ should be considered for small cracks; modern techniques may be considered.

3.11.4 Historic secondary glazing

1. Historic secondary glazing should be repaired as per window joinery. Refer to **Section 3.10: Window and door joinery.**

2. Refer to **Section 4: Ancillary works to buildings** for information on new secondary glazing.

3.11.5 Historic shutters and blinds

1. Repair of existing timber shutters and blinds can contribute significantly to a reduction in energy loss from interior spaces.

2. Ventilation requirements and control of light levels need to be considered.

3. Refer to **Section 4: Ancillary works** to buildings for information on new shutters and blinds, and insulation of historic shutters.

4. Where interiors are of recognised historic significance and historic roller blind fittings remain, repair of the blind mechanisms and fitting of new UV fabric may be grant-eligible.

3.11.6 Leaded glazing and zinc came glazing

1. Before beginning a repair to lead or zinc came windows, a report should be commissioned from a glass conservation specialist to schedule the works required to bring the window construction into a good state of repair.

2. This report should be sufficiently detailed to give an outline of the proposed works, including to the surrounding opening such as saddle bars and drainage, along with the associated costs. Include a brief outline of the importance of the glazing and identify any unique attributes that may require more in-depth investigation.

3.11.7 Leaded glass protection

1. Remove any inappropriate window protection and make new window protection in woven or welded non-ferrous or stainless-steel wire mesh with a pitch and strength designed to meet the risk. Meshes should be made by a skilled wireworker to accurate templates.

2. Protection should follow the glass line and not cover stone tracery.

3. Protection should be fixed using non-ferrous fixings into joints in the masonry ingoes, back from the outside stone face but suitably spaced away from the glass to give maximum protection.

4. To increase protection in highly vulnerable areas, consider safety glass, or where weight is an issue, clear polycarbonate. Clear sheet material should be fitted behind mesh but not against the leaded glass and be installed with adequate ventilation at top and bottom. Clear sheet used without mesh gives unsightly reflections.

3.12 Metalwork

1. Identify the form of metalwork to be repaired at an early stage to guide subsequent works e.g., cast or wrought iron, mild steel.

2. Retain as much historic metalwork as possible.

3. Weathervanes, roof ventilation louvres, solum ventilators, railings, gates or other historic architectural ferramenta should be repaired with matching materials using traditional methods.

4. Where replacement or reinstatement of missing metalwork is required this should be carried out using materials to match existing and designs/profiles taken from surviving objects.

5. Use appropriate cleaning methods of the metal and object for example: flame cleaning, needle gunning, blast cleaning and chemical cleaning. Particular care is required for cast iron due to the porosity of the material.

3.12.1 Cast Iron

1. Each project should be assessed, and the most appropriate repair technique(s) employed given the application, materials, and historic importance.

2. In certain circumstances cast iron may be welded by specialists using high nickel electrodes or brazed using aluminum bronze. Plate repairs or pinning by drilling and tapping adjoining components may also be appropriate. Cold metal stitching may also be feasible.

3. Re-casting missing components using traditional techniques might be considered. Design and quality should match existing.

3.12.2 Wrought Iron

1. Wrought iron should be removed for repair by proven experts in this field.

2. To correctly repair wrought iron, use only suitable quality recycled wrought iron or pure iron if this is unavailable.

3.12.3 Steel

1. Where repairs are necessary use an appropriate grade of steel, matching sections, and original fixing details.

3.12.4 Metalwork protection

1. Generally new steel (not cast or wrought iron) should be galvanised following manufacture.

2. Suitable long life paint treatments for ironwork, such as zinc rich primers and micaceous iron oxide build coats, should be considered for use.

3. Hard shell epoxy paints should not be used on cast iron.

4. Dry film thicknesses should strike a balance between protection and loss of detail.

5. Protection with rust inhibiting greases and waxes treatments may be appropriate treatment.

3.12.5 Metalwork decoration

1. Where significant decorative paint schemes are evident, repair should be based on paint analysis and research to establish historic paint schemes and their significance. A specialist report will be required including recommendations and specification for new paints to be used in the scheme.

2. Where there is evidence of historic gilding, re-gilding may take place.

13 Lightning conductors

1. Where a lightning conductor system is existing, its functionality to provide suitable protection should be assessed. Any repairs should be considered following the points below.

2. Lightning conductor systems can result in a considerable visual intrusion on historic structure. Historic England's publication Lightning Protection Design and Installation for Historic Buildings contains useful information for guidance on design.

3. Fixings should be secured in joints rather than stones and conductor lines are to be discreetly located behind or beside other building elements such as downpipes or buttresses.

4. Early lightning conductors may be retained and integrated into the new system.

5. Any proposed groundworks relating to earthing the conductor(s) within sensitive areas may require an archaeologist. Refer to **Section 1: Project development** for further information.

3.14 Internal works

1. Where an interior is of particular historic significance, internal repairs may be grant- eligible as part of a wider external fabric repair project.

2. In exceptional cases, historically significant internal fixtures and fittings may be grant- eligible.

3. The making good of internal finishes to match the original where these have been damaged to allow for the opening up for structural repairs will be grant-eligible, including secondary rooms. Any general repair/redecoration of historic linings to secondary rooms would not be grant-eligible.

3.14.1 Plaster repairs

1. Plaster repairs should be in lime plaster to match the original as determined by analysis of the existing.

2. In rooms where lath and plaster exists, repairs should be carried out in matching materials.

3. New lath sections should be hand split or sawn to match existing.

4. Repairs to rooms or buildings where the existing lath is lost entirely, may be undertaken in modern materials to match original appearance but this is not grant-eligible.

5. Refer to HES Technical Advice Note 02: Conservation of Plasterwork for further information.

3.14.2 Joinery work repairs

1. Carefully record, using profile gauges, the original size and form of original internal joinery.

2. Reuse any original joinery items which result from downtakings or alterations wherever possible in repair and new work.

3. Where it is necessary to repair or replace in new internal joinery sections, profile new timber of suitable species and quality to match the original design and cut and fix in accordance with best practice.

3.14.3 Decoration

1. Grant for decoration is eligible where redecoration or conservation of historically significant decorative schemes is required as part of making good interior finishes as part of other grant-aided external fabric repair work.

2. General redecoration is not eligible for grant.

3. Where application for grant is made, the internal decoration should be based on paint analysis and research to establish historic paint schemes and their significance over the course of the building's life. Proposals may require establishing a cohesive approach to return the interior scheme to one specific period. A specialist report will be required including recommendations and specification for new paints that match the identified historic colours and finish to be used in the scheme.

4. Where new schemes are required, the use of lining paper with reversable fixative is recommended but would not be eligible for grant.

5. Ensure all proposed paints are technically compatible with the substrate to be painted.

3.15 Shopfronts

1. This category may include a range of activities from repair of historic shopfronts to reinstatement of traditional shopfronts.

2. Repair work should follow relevant advisory standards for the material involved e.g., timber, masonry, and glazing. Work should consider support for specialist traditional skills such as sign writing and traditional awnings.

3. Reinstatement cannot be based solely on aesthetic reasons. We would expect any reinstatement to be based on sound physical and/or photographic evidence and to retain any remaining significant historic fabric, for example historic elements of an existing shopfront.

4. An assessment should be made of the significance of each existing shopfront, which may include hidden elements below subsequent renewals of the shopfront.

5. Careful consideration should be given to cases which require reinstatement of the shopfront height and associated internal impacts.

6. Where a highly significant shopfront interior remains, in exceptional cases, repair of interior features may be grant-eligible e.g., significant decorative tile schemes, highly decorative plasterwork.

7. Where historic evidence is not available, in exceptional cases, new works designed by the Professional Adviser, may be considered for grant assistance. New designs should be based on local precedent, using suitable traditional materials, and of a design appropriate to the character, appearance, and period of the partner building. This may for example revert back to an earlier shopfront form but should not be a pastiche of traditional styles. We will ask you to explain the case and provide justification for the work, and the proposed design.

SECTION 4: ANCILLARY WORK TO BUILDINGS

The following items relate to possible ancillary works to buildings generally (not ancient monuments) and which may be grant-eligible at a lower intervention rate than repair works. Our decisions on eligibility for each project will be assessed and set out in principle in our TAR1 report where you have applied and been successful to our Historic Environment Grant (HEG) Programme.

4.1 Ancillary works to roofs

1. Trace heating to rainwater goods can be considered beneficial where there is a risk of damage to the exterior building face or to significant historic interiors from snow or ice build-up during low temperatures and where access is difficult. A monitoring system is required for regular checks of the continuity of function.

4.2 Introduction of new safe access

1. A strategy for maintenance beyond the completion of the works should be considered, and most projects in receipt of £25,000 or more of grant-aid will be required to produce a maintenance plan.

2. The opportunity should be taken to consider if there is adequate safe access for future repair and maintenance, and if not, can appropriately designed access be introduced.

3. Introduction of new measures to assist safe access may be grant-eligible when sensitively designed and positioned on the building. This may include for example access ladders, roof hatches, internal crawl-boards, external duck boards, and latch way systems for lead flat roofs etc. as applicable to the individual building.

4.3 Installation of new lightning conductors

1. Installation of new lightning conductors can be considered where a risk assessment has been carried out which identifies potential lightning damage and resultant fire risk to the building.

2. Lightning conductor systems can result in a considerable visual intrusion on historic structure. Historic England's publication Lightning Protection Design and Installation for Historic Buildings contains useful information for guidance on design.

3. Lightning equipotential bonding should be considered if extensive electrical fit out is to take place during the project.

4. Fixings should be secured in joints rather than stones and conductor lines are to be discreetly located behind or beside other building elements such as downpipes or buttresses.

5. Early lightning conductors may be retained and integrated into the new system.

6. Any proposed groundworks relating to earthing the conductor(s) within sensitive areas may require an archaeologist. Refer to **Section 1: Project development** for further information.

4.4 New work to windows and doors

4.4.1 New secondary glazing

1. New secondary glazing installations can be considered when retaining original windows to improve energy efficiency.

2. Purpose made systems should provide a discreet installation for example bespoke aluminum secondary glazing and polycarbonate systems.

3. The design should suit the existing opening reveals and not impede existing shutters or opening operations for general cleaning.

4. New secondary glazing should not create an unventilated void. Ventilation to suit the room requirements has to be maintained and it may be necessary to incorporate openable units to suit the occupants ' use of the room.

4.4.2 Retrofit of double-glazed units

1. Where no historic glass survives in an existing window (or door), it may be possible to fit double-glazed units in the existing frames, if the existing timber sections can accommodate the wider double-glazed units.

2. Due to the design and construction of historic windows, it is normally only vacuum or narrow profile double-glazed units that may be able to be used. Vacuum glazing is thin enough to directly replace single glazing, but if narrow-profile glazing is used, the windows concerned will have to be robust enough to withstand any adaption or routing required to accommodate the thicker panes. Any works that either weaken the window or may lead to exacerbated decay should be avoided.

3. Incorporating gas fill units and/or low emissivity glass can increase the energy efficiency performance, retain interior heat, and reflect solar heat gain.

4. Modern putty glazing compound may need to substitute traditional putty, and the weighting of sash and case windows may need adjustment.

5. Refer to HES Managing Change in the Historic Environment: Windows for further information.

4.4.3 New shutters and insulation

1. Introduction or reinstatement of traditional timber shutters can contribute significantly to a reduction in energy loss from interior spaces. Designs should be based on existing shutters in the building, photographic evidence and/or the historic joinery detailing of the window / building.

2. Existing abutting joinery details should be respected when incorporating new shutters and fittings.

3. Some traditional shutter designs can be suitable for thin panel or sheet insulating products fitted within the existing shutter panels and/or window reveals / shutter pockets. Large scale details and specification will be required for consideration.

4. Where interiors are of recognised historic significance and are sensitive to UV light, installation of suitably designed new UV blinds may be considered; avoid using UV film on historic window glass as this cannot be removed easily without risk of damage to the glass.

4.4.4 External door insulation

1. Some traditional external door designs can be suitable for thin panel or sheet insulating products fitted within the existing recessed door panels. Large scale details and specification will be required for consideration.

4.5 Insulation

1. Options for insulation measures are described in the HES Guide to Energy Retrofit of Traditional Buildings, to note that not all measures may be grant-eligible.

2. The Professional Adviser should provide HES with construction details and technical calculations for any proposed insulation measures.

4.5.1 Roof insulation

1. Natural and breathable roof insulation products may be grant-eligible in some cases where its introduction will not impact on the significance of the roof / roof space.

2. In designing any retrofit of insulation, consider the risks of condensation, damp, rot and the effect on water pipes and storage tanks isolated from previous heat sources in both warm and cold roof constructions. The full isolation and draining down of water pipes and storage tanks is advised but would not be grant-eligible.

3. Avoid loss of natural ventilation and maintain traditional details.

4. Different measures may be necessary for roof features such as coombs and dormers.

4.5.2 Solid wall insulation

1. Natural and breathable wall insulation materials may be grant-eligible in some cases where their introduction will not impact on the significance of the building, its appearance, or require the loss of historic fabric or unnecessary waste of sound fabric (i.e., significant removal of existing linings and fabric such as lath and plaster).

2. General considerations should include an assessment of the impact of insulation on the existing wall fabric and the building's ventilation. Avoid dependence on membranes based on modern construction practice and consequent risk of damage from interstitial condensation. Be aware of the implications of creating cold spots and thermal bridges and the related condensation risk.

3. If proposing external wall insulation, retain significant external features and prevent damage to the underlying masonry. Insulated external renders may be appropriate if a lost covering is being reinstated, or a cement-based covering has been removed. Consider the implications for external details at wall fixtures and openings to avoid consequent thermal bridging and condensation. Consider the impact of any applied render on existing external detailing at junctions and the functioning of copes, rainwater goods, other weatherings and drips.

4. If proposing internal wall insulation, retain significant interior details and seek to supplement existing plaster or other finishes. Avoid non-breathable materials. Consider the implications for internal wall construction and detailing at junctions such as doors, windows, and other original joinery.

4.5.3 Floor insulation

1. Natural and breathable floor insulation materials may be grant-eligible in some cases where their introduction will not impact on the significance of the floor or require the loss of historic fabric or unnecessary waste of sound fabric.

2. The type of floor insulation material and method will depend on the floor construction i.e., a suspended timber joist floor or a solid floor. In either case the management of moisture and ventilation (under suspended floors), should be detailed.

3. Ensure air movement around timber joist ends and sole plates is maintained when adding insulation below floorboards.

4. Where later concrete floors have been introduced and damp conditions are present, alternative solutions such as a new insulated limecrete floor may be grant-eligible as part of a larger project.

5. Consider the detailing of the floor to wall junction and be aware of the implications of creating cold spots and thermal bridges and the related condensation risk.

6. Consider the implications for internal detailing at junctions such as doors, skirtings, and other original joinery if the floor level is to be altered.

4.6 Heating and building services

4.6.1 Heating

1. Low and zero emissions heating systems may be appropriate for historic buildings when considered sensitively and assessment has been made of the appropriateness of the heating technology for the building type and fabric in question.

2. Review current energy sources and their use in the protection of the building fabric.

3. Where a case can be made that new heating is required for protection of the building fabric, new low and zero emissions heating systems can be grant-eligible. This may include Ground Source and Air Source Heat Pumps (GSHP, ASHP), efficient electrical systems and bioenergy from sustainable sources.

4. Care is required when designing and installing new heating energy sources and systems. Carefully consider the siting of any heating installations within the curtilage of the building, including any necessary infrastructure such as substations or large plant/equipment to avoid inappropriate loss of the building's setting.

5. Heating equipment placed on or near the building, should be discretely located and sympathetic to the historic fabric. For example, the siting and shielding of ASHPs or solar panels so that they are not visually intrusive to the building. Solar panel design also requires considering reflectivity, roof loads (both weight and lift), and roof penetrations associated with their fixings.

6. Consider installation requirements internally including plant/equipment locations and routing of pipework and/or electrical cabling to controls and heaters as applicable to the project.

7. Any proposed groundworks relating to utilities within sensitive areas may require an archaeologist. Refer to **Section 1: Project development** for further information.

4.6.2 Building services

1. If applicable, for example when undertaking a large-scale repair project, or reuse of a building, a review of existing building services is advisable, and possibly a statutory requirement. This should include testing of the electrical installation and completing any upgrading found to be necessary.

2. Electrical re-wiring may be required for safety reasons; however, this is not grant-eligible unless work to original /historic fittings.

3. In all cases where electrical work has been required, the Electrical Inspection Condition Report (EICR) will be provided on completion.

4. Similarly, renewal of other building services may be required. This should be approached sympathetically to minimise any impact on historic fabric. Where historic heating or ventilation systems remain, consideration of their design and reuse should be made as appropriate.

5. Refurbishment of significant historic electrical and mechanical fittings may be considered grant-eligible.

6. Thermostatic and humidistat controls should be fitted where applicable, set to appropriate level for historic fabric and/or room contents in the case of significant interiors/collections. When controls are required for the maintenance of the historic fabric, this is grant-eligible.

4.7 Fire safety

4.7.1 Fire risk assessment and management

1. We may ask to see your fire risk assessment or equivalent fire safety management plans. This would include identification of the fire hazards, assessment of the associated risks and any necessary measures required to mitigate risks to the historic fabric. Note this would be in additional to any statutory obligations under fire legislation and Building Standards on protection of human life from fire.

2. Refer to HES Managing Change in the Historic Environment: Fire Safety Management and Guide for Practitioners 7: Fire Safety Management in Traditional Buildings and Guide for Practitioners 6: Conversion of Traditional Buildings: Application of the Scottish Building Standards.

4.7.2 Fire safety adaptations or interventions

1. Where adaptations or interventions to the historic fabric are required to mitigate against the risk of fire and/or minimise its impact in the event of a fire, then appropriate prevention and protection measures may be grant-eligible in exceptional cases, for example highly significant historic buildings and/or highly significant interiors. Such measures should aim to protect the historic fabric and retain its cultural significance with minimal visual and physical impact on the building.

2. Measures may include for example: installing appropriate sensitively designed fire detection systems; discrete passive measures such as the compartmentalisation of roof spaces; fabric interventions to enhance fire resistance (intumescent linings, fillers, and seals); unobtrusive signage and lighting of escape routes.

3. Appropriate fire suppression systems such as sprinklers may be considered grant-eligible in some cases where the reduction in the risk of fire damage to the fabric or contents outweighs the harm of the installation and the potential harm from 'false' activation or from leaks. In the design of these systems, consideration should be given to discrete but effective maintenance access and the ability to test the system without damaging the historic fabric or building contents.

SECTION 5: MASONRY MONUMENTS

The following items relate to work to ancient monuments generally and will in most cases be grant eligible unless stated otherwise. HES' decisions on eligibility for each project will be assessed and set out in principle in our TAR1 report, should your application progress.

This section considers masonry structures of a range of heights and conditions. These will mostly be ruins but can include structures that survive up to their wallheads and are occasionally roofed. The construction will likely to be of formal masonry, bonded with a mortar, clay or of drystone construction.

5.1 Masonry

5.1.1 Repairs to mass masonry

1. The primary aim of works should be to try and retain as much of the historic fabric and the existing character of the masonry as possible.

2. In the main, masonry wall consolidation will be restricted to raking out defective mortars, following by tamping and pointing with new mortar. A range of other methods may be required in order to ensure stonework is preserved and/or for structural stability.

3. The same approach of fabric and character retention should be applied to clay bonded or drystone structures. However, care will be required to replicate historic drystone construction methods.

5.1.2 Mortar analysis

1. When using mortars, conservation mortar specifications should be informed by an understanding of the existing material. Technical analysis of a historic mortar for a new specification can be ambiguous, given leeching of lime, and other decay mechanisms associated with loss of roof covering and weathering details. It is also unlikely that a single mix prevailed through a large site. Nevertheless, mortar analysis can inform on matters of aggregate and additives. Mortar analysis for technical or research purposes will not be applicable or appropriate to every project and should be restricted to where it will add value to the conservation works.

2. Visual mortar analysis can help understand the phasing of a site and identify where historic mortars survive.

3. Consideration should be given to matching the various phases and retaining areas of surviving historic mortars where this conserves a monument's character and will not undermine the overall conservation work.

5.1.3 Removal of cement pointing

1. Cement pointing should be removed where it is causing damage, and removal will not result in damage to the existing masonry.

5.1.4 Clay and earth mortars

1. Original lime/earth/clay mortars should be retained and conserved. When using new materials this should be informed by an understanding of the existing material: its appearance, inclusions, composition, etc. to assist in matching colour and its performance. Scientific analysis may be considered in some cases where it will help answer specific queries.

5.1.5 Pointing styles

1. Joints in historic masonry should be finished to allow the current character of the masonry to be retained, rather than match the original pointing style. This will normally be arris to arris or inch back. Care should be taken not to obscure historic detail or differences between different phases of construction. In rare cases slaistered/flush pointing, lining out of pointing and other finishing styles may be considered, such as where it matches the historic and existing character or in very exposed environments where this will provide additional protection.

2. Agreement should be reached on site as to the best practise for that section of work. In many cases this will be best achieved by including in the works programme the production of 1m x 1m sample panels, with one for each masonry or pointing type, for discussion and approval with the HES team prior to the rest of the works taking place.

3. Approved sample panels should be clearly marked and kept for the duration of the works as a visual reference during the works for both stone masons and inspections.

5.1.6 Pinnings

1. Small pinnings will often be required to fill voids in the stonework, although larger stones may be suitable in certain circumstances for bigger voids. Pinnings should not be packed too tightly.

2. New pinnings and/or stones should generally be of the same form and geological origin as the original ones and should seek to mimic the pattern of the surrounding and/or historic masonry, to maintain the historic character and allow for a reading of phasing to continue. In some circumstances, pinnings of other material can occasionally be considered, such as hardwood timber in drystone structures with friable masonry.

3. Pinnings should be set fully into the matrix of the wall, not simply pressed onto the surface.

4. As with pointing, a repining sample panel is very useful.

5.1.7 Rebedding or replacing stones

1. Where stones have come loose, they should be taken out, the socket raked of defective mortar and the stone mortared back into its original position.

2. Where a piece of rubble masonry has been lost, damaged, or has otherwise failed, consideration should be given to sourcing a similar stone (in size and character, ideally from a supply of salvaged loose stone found on site) as a replacement, raking out mortar and repointing as necessary to accommodate the replacement stone and to ensure the character and structural integrity of the rubble wall is maintained.

5.1.8 Indenting

1. Where individual stones in ashlar masonry are failing and placing the survival of adjacent stonework at risk, consideration should be given to indenting or partial-indenting these with new stone.

2. Replacement of failed stone on a like-for-like basis will often be preferred to a mortar repair as in the longer term it can retain the masonry's character and help provide structural integrity.

3. The process would involve the careful cutting out of the individual stone/s without damage to surrounding masonry, and the careful selection, sizing, and tooling of the replacement stone to ensure the current character of the overall masonry area is retained. The exposed surfaces of new stone should generally be hand-dressed to match the existing face or tooling of adjacent stones. New stones should be oversized to allow for hand-dressing of exposed surfaces prior to tooling i.e. avoid droving or broaching a polished/sawn surface. Replacement stone should be cut on the correct geological bed for the circumstances of its use in different elements of the building. Indented face stones should have a minimum bed depth of 150mm and may extend to the full face of the stone, but partial-indents should be considered where structural integrity can be achieved whilst retaining as much historic fabric as possible.

4. Consideration may be given to reintroducing a stone face at the original line of the wall face, where this will not affect the overall character of the wall, particularly where this would provide the requisite structural integrity and weathering performance. For approaches to decorated masonry decoration (see **Sections 5.1.12** and **5.5.4**).

5.1.9 Wallfaces

1. Where large areas of wallface have been robbed or have failed, as is often the case around quoins and lintols, these often contribute to an asset's history and current character. In most cases the aim will be to consolidate these as close to their existing appearance, whilst often trying to ensure support for the masonry around and above the gap. Exposed wall core should be consolidated where possible, with the aim that it will continue to be read as wall core. Additional pinnings may be required in order to support the historic core. Care should be taken not to build this out to the full extent of lost material and/or wallfaces. In most cases slaistered mortar and carefully angled pinnings can be used to encourage water shedding away from the core of the structure and ensure robust conservation. This is similar to rough racking in **Section 5.2.5.**

2. Various options can be considered to support overhanging or unsupported masonry around areas of exposed wall core. Where there is sufficient stable surface below, consideration may be given to building up discrete areas of new stonework in order to directly support masonry, these can often corbel out to catch areas not directly overhead. Metal pinning or support bars can also help. Refer **to Section 5.1.11: Structural repairs to monuments**.

5.1.10 Cleaning of masonry

1. On monuments there is a general presumption against cleaning of historic masonry elevations unless there is good reason. However, the removal of graffiti will be necessary, and appropriate techniques are to be used. Refer to Section 3.8.2: Removal of graffiti from masonry.

5.1.11 Structural repairs to monuments

5.1.11.1 Structural support to large elements

1. The insertion or replacement of certain mass masonry elements may be necessary where there is a structural, safety or weathering reason. Likewise, where there is an identifiable risk of collapse it may be appropriate to provide discreet support without confusing the historic evidence. In some cases it may be possible to achieve this through the insertion of modern piers or buttresses, usually of masonry but occasionally requiring the use of more modern materials, on as small a scale as is consistent with providing support.

2. For larger interventions, consideration should be given to incising the date of their construction at some point, or by means of differentiating the new work from the surrounding masonry. Ideally a single method and sensitive approach should be adopted.

3. In more extreme cases bracing or ties might be necessary.

5.1.11.2 Support to smaller masonry elements

1. Masonry walling at risk by broken or missing masonry can be supported by strategically placed non-ferrous bars. For example: broken lintels; missing mullions and window tracery; masonry that has been left unsupported by the loss of lower facing stones.

2. Where this approach is adopted, the bars must be set into joints or existing soffits rather than into stones, and every effort must be made to insert the bars without having to widen the joint. In some cases it may be appropriate to alter the bar ends to assist stability.

3. New bars should generally be shaped to match the shape of the masonry it is supporting, where this will not significantly undermine structural integrity. The need for new packing material between supports and existing masonry should be kept to a minimum. Consideration should be given to marking any new stone packing as non-historic.

4. Where there is a risk of more serious structural collapse, proprietary ties, such as stainless-steel helical bars, may be considered to stitch cracks or pin facing masonry back to the wall core.

5. Individual pieces of masonry may be reconnected to the main structure with resin anchors or other forms of dowelling or pinnings. Where these are used the ends should be masked discretely in a suitable finish.

5.1.11.3 Re-building of unstable masonry

1. When the inherent instability of a monument leaves no alternative but to take down and rebuild areas of masonry in order to support what survives, it should be ensured that the wall is rebuilt to the same arrangement, replicates the appearance of the original as far as possible using grids, photographs or laying out, while still making it distinguishable on close scrutiny.

2. Where historic masonry has been lost, reintroducing wall material may sometimes be the best way of restoring structural integrity, where this will not have a significant impact on the ability to appreciate the historic fabric or where alternatives would be more intrusive. New masonry should sit sympathetically with what is there, but be distinguishable on scrutiny. Means of differentiating new work may be achieved by: recessing the work, using a different form of wallface finish (such as coursed or dressed in the case of rubble walling, or replicating wall core where facings are not being reintroduced); recessing the mortar; inserting a slate perimeter to the new work; or a date stone. Ideally a single method and sensitive approach should be adopted.

3. Any new masonry should be kept to a minimum and introduced with the aim of stabilising the wall whilst not affecting the wall's existing character.

5.1.11.4 Grouting of mass walls

1. Where structures have been subjected to continual saturation and consequent loss of binder from the wall core, gravity grouting with an appropriate lime-based mix may be required to ensure the structural integrity of the wall core and the masonry skins.

2. Grout should not be fed under pressure and measures must be taken to prevent staining.

3. Grout specification and a method statement should be prepared.

5.1.11.5 Protection of open vaults

1. To protect the masonry and mortar of an open vault from water and frost damage a number of options may be considered. This includes rake, tamp, pinning and pointing voids.

2. It is usually beneficial to also cap the vault. As these are often floor spaces, any solution should consider potential access and any implications this might have for how robust a solution should be explored. Drainage is often a resulting issue which will also have to be considered.

3. Options include the use of a clay capping with turf, lime concrete with provision for water protection, paving, sika, poured asphalt, etc.

4. As with arches, vaults often depend on the surrounding masonry and the weight of material above to maintain structural integrity. Consideration may be given to supporting vaults with metal supports or using metal tie rods or pattress plates to redress spreading. However, it may be necessary to consider reintroducing masonry where this can be achieved without significantly impacting on the monument's cultural significance. New material should generally be kept to the minimum necessary to restore structural cohesion. Care should be taken to avoid obscuring important features. Drainage may also be an issue which has to be considered.

5.1.11.6 Protection of small gaps

1. In consolidating masonry it is often important to retain small features and openings. For example it is essential that care is taken to ensure that no evidence for the location of timbers should be lost or modified. Such evidence might include the pockets for joists, beams, putlog holes, dooks, and the chases for straps.

2. Where there is a risk of damage being caused through plant growth or birds nesting in small openings or sockets, a sloping slate can be bedded in the pocket, set so that it is not jarringly visible. A balance must be struck between the protection of the monument and established habitats for birds or other species.

5.1.12 Replacement of decorated stones

1. If a moulded or carved stone has to be replaced, as far as possible its historic profile and detailing should be carefully established from the stone itself, or an adjacent stone of the same moulding may offer a better template.

2. Where this is not possible, in certain cases it may be appropriate to obtain a fuller understanding of missing or damaged details by reference to better preserved stones serving the same function and forming part of the same feature.

3. Where it is not possible to establish the original profile and detailing of a moulded or carved stone that has to be replaced, by looking at the surviving fabric or archival research, conjectural reconstruction will rarely be appropriate. The stone should normally be replaced with a plain or blocked out replacement.

4. Care should be taken to ensure that any new stonework maintains the current character of the existing masonry.

5. Any replacement of stones should be preceded by a detailed survey and photographic record of the adjacent area so that the original dimensions of the stones to be replaced and their relationship with the surrounding stones can be fully established and recorded to avoid the loss of evidence embodied within the stonework.

6. The surface finish of new stones should generally reflect the tooling on other stones close by, or where other evidence exists.

7. As a result of weathering and previous repointing, the width of the joints between the stones will often have become wider. Stone replacement within such contexts should normally aim to respect the intentions of the original work, and the ratios of joint width to masonry course thickness be preserved.

8. Dimensioning of new stones should be oversized to allow for hand-dressing of exposed surfaces prior to tooling i.e. avoid droving or broaching a polished/sawn surface.

9. A replacement stone should not provide a ledge on which rainwater can lie.

10. After assessment, a new stone may replace part of a stone with a partial-indent repair, but the effect of this new geometry on an elevation should be considered.

11. A discreetly incised date can also be considered as a way of demarking new carved stones.

12. Where insertion or replacement is thought necessary, consideration should be given to how the removed stone will be curated, managed, and cared for subsequently.

5.1.13 Siting of new stones

1. In replacing masonry, consideration should be given to setting new stones to the line of the original wall face, especially if worked or moulded.

2. Where there are indications that the wall face has been cut back, or where the general wall face is extensively weathered, it may be necessary to set the new stones further back. This is especially the case where the new stones would otherwise project excessively, where stones set proud of the surrounding face might exacerbate the decay of adjacent stones or where there would be an impact on the visual character of the monument.

3. Dismantling of adjacent areas of masonry to permit the insertion of replacement stones should be avoided.

5.1.14 Source of replacement stone

1. Where there is no alternative to the replacement of stonework, the new stone should match the stone to be replaced as far as possible in its geological origins, its texture, its colour, its weathering characteristics and its porosity.

2. Salvaged stone from the locality may be one source of geologically suitable materials for some monuments. It may occasionally be appropriate to use fallen stones for consolidation work, such as where they are loose, or it will improve the visitor experience. Large areas of collapse that bury and preserve walls should rarely be removed. Where this is acceptable care should be taken to identify, avoid using and record decorated stones; archaeological supervision might be required.

3. Any proposals for removal of stones from against the wallface should make provision for consolidation of newly exposed wall and have contingencies in place for any unforeseen conservation or consolidation issues that might be exposed.

4. Stone analysis may be relevant in some cases to inform replacement stone specification.

5.1.15 Historic plasterwork and finishes

1. Every effort should be made to retain historic plasterwork and other surface finishes where they survive, but where they have been lost it is preferable not to replace them. Exposed masonry is often a key element of a masonry monument's current character and significance.

2. Historic plasterwork should in most cases be preserved in situ, generally with edge pointing. In some cases a thin lime slip may be applied as a sacrificial coat.

3. In some cases consideration may be given to giving additional weather protection to surviving decorative plasterwork.

4. Exceptionally, consideration would be given to the relocation of delicate ornate fragments or painted elements where there is a serious risk of their total loss.

5. If, in exceptional cases, any areas of plaster have to be replaced, every effort should be made to match the composition of the original, while finding ways of differentiating the new from the old on close scrutiny.

5.1.16 Exposed historic floors and surfaces

5.1.16.1 Approach to the protection of historic surfaces

1. In some cases it may be best to protect historic surfaces from further damage by covering them over. If they are to be obscured the location should be recorded and marked.

2. Floor surfaces revealed through excavation or opening-up are vulnerable on a number of levels, and timely protection, temporary or otherwise will be required to prevent damage and/or loss. Where this is anticipated it will often be important to ensure an agreed specification for rapid action, including protection or avoidance is in place. In some cases archaeological evaluation may be required beforehand to help identify the presence, condition, and sensitivity of surviving surfaces.

5.1.16.2 Extant flooring

1. Missing elements of flooring should generally not be reinstated unless there is an access and visitor management issue, or it aids in protecting material below.

2. Where it is necessary that voids in historic paved finishes have to be infilled in order to consolidate surrounding surfaces, this is usually best achieved by the use of lime concrete with a separating layer of geotextile, although reinstating the paving can be considered.

3. For fragile external paved, setted or horonised surfaces with lower levels of foot traffic, it may be most appropriate to cover them with turf if exposure is likely to put their survival at risk and they add little to the significance or character of the monument.

4. Original glazed or unglazed, decorated, or undecorated floor tiles may need protection. Consideration may be given to providing in situ protection to small areas, possibly in the form of boxes with lifting lids. If they cannot be reasonably protected, alternative solution should be investigated.

5. Ground moisture effecting historic floors may require management. If sub-surface drains are essential, they should not be run through those areas where there are historic floor finishes. Ideally, drainage should focus on adjacent areas, sometimes outside the building. If, however, it is entirely inescapable for conservation reasons, the areas to be disturbed should be kept to a minimum, and the finishes should be carefully recorded before lifting so that they can be reinstated as before. Such work should only be carried out under archaeological supervision.

5.1.16.3 Openings

1. In most cases openings are a key part of a monument's significance and should be left open. However, there are cases where it may be desirable to prevent ingress.

2. Stainless steel or bronze nets may be stretched across larger openings to prevent bird ingress into enclosed areas. Window openings may be closed in a similar fashion or with stainless steel or bronze mesh. If fixings are required, these should be set into joints.

3. An assessment of the possible structural impacts of introducing protective measures should be prepared.

4. Stainless steel netting could also be used to prevent bird access in chimney flues.

5.2 Capping of wallheads

5.2.1 Selection of capping options

1. Wallheads should provide protection to the core construction from rainwater. Protection of wallheads to some degree will be required, especially as the climate changes.

2. In areas at height, where access will be at extended intervals, the durability of the protection will have to be considered.

3. Consider the best way of preventing water ingress at the wallhead and shedding water including factors such as the thickness of the walls, character, and appearance of the surviving wallheads, surrounding vegetation, and potential future management options. Solutions should take account of cultural significance.

4. Where it is not feasible or appropriate to fit copings to shed rainwater, alternatives may be considered.

5.2.2 Soft capping

1. Soft topping, usually comprising turf and sedums over a clay base or other water proofing layer, is often a good method of consolidating low wallheads, or where vegetation forms part of a monument's character.

2. Clay with a grass and turf cover has proved effective in this type of work, providing there is appropriate detailing to prevent staining of the adjacent masonry.

3. Soft capping may not be appropriate in all circumstances. Soft capping should not be applied indiscriminately. Small, particularly high, or dry sheltered areas are not always suitable.

4. Invariably the wall head will need repair and consolidation, with re-bedding of the top stones as a minimum.

5. Consideration should be given to maintenance, particularly in drier environments where the clay may have to be replaced and added to, or in wooded environments where regeneration of trees may have to be controlled.

5.2.3 Turf for soft capping

1. Turf to be used on wallheads should not be cut from within the archaeologically or historically sensitive area around the monument, the scheduled area, or a Site of Special Scientific Interest.

2. Where possible any established turf from the existing wallhead should be re-bedded.

3. Where new turf is required, ideally this will be as close a local match as possible, and it may require to be ordered from a specialist supplier. Care should be taken not to introduce any inappropriate species. Specification must take account of the local climate, natural diversity, and risk of invasive vegetation colonisation.

4. If turf is to be locally procured, turf from mature pastures of diverse species composition should be used; much current pasture features modern strains.

5. The turf should be secured with a natural fibre net, or oak pegs, while the grasses root down.

5.2.4 Hard capping techniques

1. Appropriately detailed masonry, consisting of slabs or similar configured stone may be suitable instead of rubble, but the visual impact of such work must be considered.

2. The mortar specification will depend on exposure, height, anticipated maintenance cycles, and adjacent masonry. This may, in some circumstances, include the use of cementitious mortars, where considered appropriate and where there will be no detrimental impact on the surrounding fabric.

5.2.5 Rough racking

1. Where facing masonry has been lost and only a rubble core remains, this can be preserved using a protective layer of rubble of appropriate dimensions and mortar to mimic the character of the surviving core.

2. In some situations additional detailing may be required to ensure water run off clear of other surfaces or elevations.

5.2.6 Use of lead or lead substitutes

1. Lead and similar lead substitutes may be suitable to cover wall heads, especially if the surviving masonry is more intact with level surfaces. However, the visual impact should be carefully weighed up, and the material should be suitably detailed to ensure water is not channeled and concentrated onto masonry below. Careful detailing will be necessary. Sometimes additional drainage arrangements may be required.

2. The specification of large areas of lead should be made with consideration to the likelihood of theft. If this is the case, then the use of an alternative material may be considered. Refer **to Section 3.2.8: Security of Metals**.

3. Proprietary membrane systems may be considered as an alternative option for the repair or renewal of an existing impermeable cover where appearance and effectiveness to shed water is not further compromised.

5.2.7 Asphalt coverings.

1. When using or repairing an asphalt strip, care must be exercised to avoid fouling the wall faces in applying it.

2. In general such finishes should not be used where the wallhead is readily visible.

5.3 Rainwater dispersal

1. Where drainage of rainwater is required from wallheads, roofs, the surface of vaults or other flat areas, especially where existing, historic water dispersal methods have failed, causing additional erosion or are no longer existing, guttering and/or pipework may be required.

2. Alternatively, an appropriately detailed spout arrangement may be provided.

3. Any drainage should direct water well away from walls and elevations.

4. Any solution should seek to limit any impacts on the remainder of the monument, its character or fabric. Care will have to be taken not to obscure or detract from important features or elevations. Using existing openings, where appropriate, will help avoid the need for drilling into masonry. Any fixings should be into joints. Any sub-surface drainage should avoid sensitive earthworks or buried archaeological remains. Archaeological work may be required beforehand to identify any archaeology and provide mitigation if impacts are acceptable.

5.4 Reburial of exposed masonry

1. In some circumstances the reburial of parts of a monument, or its entirety, may be considered necessary to counteract deterioration e.g. through forces of climate change, frost and weathering, the pressure of diminishing resources, and/or health and safety concerns.

2. Reburial as an option will only be considered following an assessment of the monument's significance, condition, and management context.

3. Where walls or other features survive only as foundations or as fragmentary lower courses, it is sometimes less damaging to preserve them by covering them with earth rather than by leaving them exposed and consolidating them.

4. Where important features for the understanding of the monument are to be covered by earth, the line of the covered walls can be indicated by bands of mounded earth, by lines of stone kerbs or by keeping the top course proud of the turf. It may also be possible to indicate buried material with interpretation, where that is being provided.

5. Earth to be used for the mounding should not be taken from archaeologically sensitive areas, and if it is to be brought in from elsewhere care should be taken to avoid introducing ecologically inappropriate material.

5.5 Repairs to other types of structure

5.5.1 Repairs to drystone structures

1. Repairs to drystone structures should generally follow the same principles outlined for mass masonry. Historic builders often developed their own approaches to drystone construction, this should be replicated as close as possible. Any desire to introduce structural integrity by changing the style of masonry build should generally be resisted.

2. More complex drystone monuments will often have revetments and other structural devices built into their construction which are often obscured within the fabric of the structure or subsequent collapse. Removing or interrupting these can lead to structural degradation and collapse. Therefore, every attempt to understand these historic engineering and structural features should be made prior to designing and undertaking any works. Understanding the original building technique may require archaeological investigation.

3. Drystone constructions tend to move, settle and respond to seasonal changes more than mortared constructions. This should be considered when thinking about repairs, such as the use and density of pinnings.

4. In the rare cases where mortar is the most appropriate way of securing structural cohesion or areas of stonework, this should be discrete, hidden from view and reversible.

5.5.2 Repairs to harbours and marine structures

1. Repairs should retain as much as possible of the original stonework and surfacing.

2. Coursing and pointing patterns should be retained, including the use of open joints.

3. Timber elements such as pilings and fenders should be retained if sound. Where they are failing consideration should be given to retaining them and providing new, sensitively designed structural elements that support the historic fabric and visual character of the feature.

4. Iron access ladders, bollards, mooring hoops and other fittings should likewise be retained unless there is good reason, such as where the fixings are causing stone cracking and there is no alternative to reduce this or to retain them through other methods.

5. When re-instating hearting similar materials should be used.

6. Mass concrete is not normally appropriate.

7. Modern concrete may sometimes be appropriate for repairs to pier decks where it is already in situ.

5.5.3 Repairs to modern industrial and military structures

1. For large sites comprised of multiple structures, a targeted approach that conserves the most significant, prominent, or most likely to be successfully preserved structures may be appropriate.

2. These will often include concrete structures with steel reinforcement (rebar), large metal infrastructure, machinery, and structural supports, and/or brickwork. Military structures in particular were often not built to last, built of poor-quality materials and are vulnerable to decay.

3. Concrete structures can be particularly vulnerable as the bond fails or as rebar or supporting structural metalwork is subject to exposure and water ingress, resulting in rusting and jacking.

4. Most concrete conservation will be patching gaps in the historic material caused by deterioration or arresting further corrosion of rebar using chemical treatments. In some instances, wholesale replacement may be required where there is more substantial risk of structural collapse. Patching with new concrete should seek to match the character (colour, hardness, aggregate, and dimensions and alignment of formwork or board-marking) of the historic material as close as possible. However, use of pre-prepared concrete mixes may be appropriate, particularly if this is likely to increase the success of the repair. Rusting or decaying metalwork such as structural beams, window or door frames, or machinery tracks may need to be repaired, altered, or replaced where deterioration is affecting the surrounding material.

5. Larger metal infrastructure can include support beams, joists, lintols, frameworks but also surviving fixtures, fittings, and fixed machinery. As well as being structural, they can form a key element of an overall monument's cultural significance or be significant in their own right.

6. Most brickwork repair work will follow the same principles outlined for mass masonry. New brick should seek to match the existing in colour, dimensions and texture and care should be taken to replicate historic brickwork patterns. Where a closely matching brick is not readily available, commissioning a specialist to create brick to match should be considered. Original mortars are likely to be cementitious. Use of similar will likely be acceptable unless a lime mortar is likely to benefit the conservation of the structure.

7. Blocking of window and door apertures with infill masonry should normally only be carried out when required for structural stability or to limit access to areas where there is a significant risk from structural collapse or where there are unprotected heights. Infill masonry should be readily distinguishable from historic fabric and be reversible.

8. Confirmation of the existence of asbestos arising from suitable survey or testing may require works for specialist wholesale removal if there is a risk of damage or disturbance. Replacement of features such as asbestos sheet roofing with modern equivalents may be acceptable (i.e. in accessible or well-used areas) and should be specified to closely match appearance in colour and profile.

9. Mechanical features or other readily-dismantled features should generally be repaired in situ but may be temporarily removed for refurbishment and reinstatement where this can be demonstrated to benefit their conservation.

5.5.4 Architectural sculpture

1. Where important sculpture is at risk of decay due to its exposed situation, consideration may be given to providing in situ protection, by the least intrusive means that can be adopted.

2. Where the sculpture is set vertically in a wall face, the hood-moulding or string course above could potentially be repaired, augmented with lead, or a new protective projection constructed of an appropriate material.

5.6 Vegetation control

5.6.1 Vegetation on or close to monuments

1. Where invasive vegetation presents a problem at above or below ground level of the monument, it should be removed if it can be done without causing damage.

2. Removal of vegetation without follow-up consolidation to the masonry beneath may accelerate damage.

3. Undergrowth close to wall footings should be managed carefully; proper air movement around the base of a wall should be maximised.

5.6.2 Trees and shrubs on or close to monuments

1. Shrubs and other woody growth should generally be removed from masonry structures where this can be undertaken without damage to historic fabric. The effects of taking out woody root systems from within the masonry of the monument should be balanced against damage to the monument. Control of Adjacent Trees and Shrubs where they are likely to cause damage and create a microclimate where moss and lichen can grow may be considered.

2. Shrubs and their roots should be managed to keep below ground drainage clear, noting archaeological considerations.

3. If removing damaging woody growths close to monuments, these should generally be cut off at ground level and left to rot in situ rather than pulled up

5.6.3 Use of biocides and herbicides

1. In preventing regrowth, full account must always be given to the implications of the use of any chemicals as part of the process of dealing with vegetation. Advice should always be sought on the use of herbicides.

5.6.4 Management of ivy

1. Once established, ivy can protect masonry, but it will ultimately embed roots throughout masonry and add additional weight, which is often subject to windblow, which can destabilise the monument. Whilst cutting back outer growth can help reduce the pressure on the masonry, removal of roots can leave voids in the masonry and should generally only be done ahead of a confirmed scheme of masonry consolidation. Ideally, this should be done a year in advance, but this will not always be possible within the timeframe of a grant-aided scheme, and we do not fund retrospective work.

2. If ivy contributes to a monument's character it may be possible to find a way of reestablishing ivy following masonry consolidation without the ivy putting roots into or coming into direct contact with masonry, such as using a low impact species and/or using a lattice frame in front of the wall face.

5.6.5 Control of moss

1. This should only be removed if it is causing water retention and consequent damage to the underlying stonework. Causes of water concentration which causes such growth should be investigated.

5.7 Construction

1. Planning construction work in some locations will have to consider temporary or protected access routes, the protection of turf, earthworks, buried archaeology or natural elements and making good sward or other natural features. Impacts may come from direct ground disturbance, erosion, or compaction. In nearly all cases, these impacts should be avoided. Mitigation can sometimes be achieved through ground protection. These considerations will also apply to site plant and welfare facilities.

2. Ideally, all scaffold will be free standing, with ground protection to avoid impacts from scaffold feet and not in contact with the masonry. If contact with masonry is required for structural reasons, loading or to enable access to hard-to-reach areas, then it should be carefully designed to ensure the monument is protected and not subject to undue pressure.

5.8 Topography, earthworks and buried archaeological deposits

1. Existing ground profiles should not be interfered with. There should be no changes to those profiles that are not justified by the conservation needs of the monument. Any proposals should be informed by an understanding of the cultural significance of the contribution of the topography to the monument's setting, any earthworks or potential sub-surface archaeological deposits that may be affected. Archaeological investigation may be required to understand the presence and/or significance of any deposits to inform any decision to intervene and the design of any intervention. Any ground-breaking should seek to avoid or minimise impacts as much as possible.

5.9 Improving access

1. Various forms of work may be required in order to improve public access to and engagement with monuments, where that is appropriate. This can range from creating paths to a monument to providing safe surfaces, barriers, viewing platforms or high-level access. Enhanced public appreciation of a monument may occasionally include lighting and/or interpretation signage. Proposals should seek to avoid direct impacts into historic fabric and limit the impact on the character of the monument and important elevations or features. The grant eligibility of proposed access improvements will be considered on a case-by-case basis, but the following principles should be followed.

5.9.1 Paths

1. For paths for public access, the design for this should be informed by the type and levels of public access envisaged. Every effort should be made to limit visual and direct impacts.

5.9.2 Stairs and high level access

1. Where historic access routes survive and can be brought back into use without significant intervention these can often provide the most appropriate access to lower and high levels.

2. Only slight variation may be required in some cases to enhance steps to allow safe access, this can sometimes be achieved by adding stone slips or, where good evidence survives, and new stonework can be added without cutting out historic stone.

3. Other forms of framework, possibly in timber or metal, built over historic walkways, may sometimes be appropriate. All attempts should be made to avoid or minimise impacts on historic fabric, including stair soffits and newels.

4. New access or viewing frameworks, including those to high levels, should seek to minimise pressures on the surrounding fabric for stability. Ideally fixings should be avoided, but, if required, the number should be minimised and located into joints. Every effort should be

made to ensure any new structures are visually unobtrusive and do not obscure important elements of the monument.

5. In some instances handrails may be required for some historic stairs and routeways in order to enable safe access, especially where more enhanced levels of access might be required. These can be of rope, wood or metal. Every effort should be made to ensure they are as visually unobtrusive as possible. Fixings should be minimised and only located into masonry joints.

5.9.3 Surfaces

1. Where public access is desired onto historic areas, such as floors, corridors, and walkways, and where the historic surfaces no longer survive and/or the existing surface is significantly uneven consideration can be given to providing a new surface, once the surviving material has been consolidated.

2. This can be achieved through a variety of means, such as a lime concrete screed, ideally placed over some form of membrane to separate the new from the historic materials. In some cases, asphalt might be suitable, provided provision is made for managing bossing, rips, and erosion. Paving may be appropriate where there is a desire to maintain the historic character of a particular area. This should seek to match the original, where this survives. Where the historic surfaces are very uneven consideration may be given to introducing a wooden or metalwork framework.

5.9.4 Barriers

1. Monuments can sometimes be placed in elevated positions or have high level openings that pose a fall risk to visitors. Low level openings can also pose access or security risks. Where such risks have been identified it is often possible to put in bars and/or lattice work to restrict access and reduce those risks.

2. Every attempt should be made to ensure bars or other barriers are as visually unobtrusive as possible and do not block views through openings.

3. Fixings should be into joints. Where no joints are available, it may be possible to fabricate a clasp onto the masonry or ensure a secure hold through pressure.

5.9.5 Services

1. Fixings for new services etc. should be avoided as far as possible but, where they are inescapable, they should always be made into the mortar joints; this will minimise the physical and visual impacts on the masonry and the addition of potentially confusing elements to the masonry.

5.9.6 Signage and notice boards

1. Signage should be sensitively placed away from main, important, and sensitive elevations and not obscure important features. If it cannot be freestanding, it can be placed on unobtrusive stone slabs or cairns, ideally placed on the ground surface without foundations, or attached to masonry using fixings into joints.

5.9.7 Boundary marking and enclosure of sites

1. Some sites require the discreet marking of boundaries. In some cases this will have been done in the past. These often involve stone or concrete markers that define the perimeter of a site. Where these exist, they should be maintained, or replaced like for like.

2. More substantial enclosure might be required in order to prevent unwanted or stock access. Where required it should be appropriate to the area and reflect enclosure traditions close by. This might mean post and rail, strained post and wire, more formal estate fencing or a drystone dyke.

5.10 Temporary supports

1. Whilst a grant-aided project is in progress it is possible that masonry may become temporarily unstable or place staff working on the monument at risk. This can happen, for instance, whilst structural issues are being addressed or ivy and/or tree roots are being removed. Where this is the case, temporary measures should be put in place.

2. Types of support can include: proprietary steel props, timber props, sandbags or, in more extreme circumstances, sandbags filled with limecrete.

3. Every effort should be made to ensure that these do not damage historic fabric. Consideration can be given to placing timber or other protection at propping ends and ensuring any driven timber stakes or metal spikes necessary to retain timber bracing or props avoid or have limited impact on sensitive remains and buried archaeology.

4. It is essential that temporary supports are removed as part of the consolidation works.

SECTION 6: OTHER FORMS AND PARTS OF MONUMENTS

This section refers to a variety of structures, including monuments that were designed to be or include earthworks, those that now appear as earthworks – such as buried walls and middens, standing stones, sites composed of low walls, historic burial grounds, and other whose footprint is largely at ground level.

Many monuments, including those with larger standing masonry elements, will be composed of combinations of these types and each area will have to be considered separately. This section also includes conservation methods that can apply to monuments of all types, such as those at risk of coastal, loss of water-logged conditions or stock erosion. The standards in this section will have to be used in an appropriate combination to suit the composition of each site. In many cases, standards from other sections may also apply.

6.1 Eroded or poached ground

1. There may be cases where the re-establishment of eroded ground profiles has to be considered. This might be to prevent further erosion, or the destruction of habitats for species that have caused damage to the site.

2. Where profiles are to be restored, new profiles should seek to match that of adjacent areas of the feature. Large areas of new material should be differentiated from original surfaces.

3. For smaller areas of erosion it may be possible to infill gaps with compacted new material. Larger areas, especially where some degree of structural stability may be needed while repairs stabilise, it may be beneficial to use sandbags.

4. Grass covering should be encouraged to keep new material in place and help bind it in with surrounding soils or structures. In some cases seeding may be sufficient but on slopes or in exposed areas it may be beneficial to use new turfs or coir matting. Seeded matting can encourage quicker turf establishment.

5. Earth should be imported from outside scheduled areas and be archaeologically sterile.

6. Where fresh earth is imported to a site or new seed is sown, this should not change the established ecology of the site.

7. For middens or artefact scatters, care should be taken not to disturb in situ deposits. Archaeological monitoring may be required to record and archive deposits if disturbance seems likely.

6.2 Burrowing animals

1. Burrowing creatures posing a major threat to earthwork monuments may have to be removed by means that involve no disturbance of ground levels unless the species involved has legal protection. It will be necessary to introduce an active management regime which prevents re-infestation by either the removed species or by other species. Options can include steel netting below the ground surface or around and below enclosing fences.

6.3 Standing stones

1. Standing stones can occur alone or in groups. Their position has often been carefully chosen, this can include their location and the rotation and angle of the stones. Retaining their position is a key part of their cultural significance.

2. Where stones have been incorrectly relocated in the past, consideration should be given to correcting that.

3. Before deciding to re-erect falling standing stones that fell over some time ago, it will be necessary to consider whether their fallen position and appearance has contributed to their current or historic cultural significance. Where this is the case, such as where fallen stones appear in important artwork or have attracted folk stories that emphasise them in their current position, they should generally be left recumbent.

4. The same consideration should be given to standing stones than have been leaning for some time. Where the lean is part of their cultural significance it may be appropriate to support them in their current position (or recent, where the lean has increased). This can sometimes be achieved through supports or bracing.

5. Where a decision has been made to re-erect a fallen or leaning standing stone archaeological excavation will be required in order to understand what remains of the original socket and support for the stone. This should also record any related archaeological deposits, but these should generally be left in situ if they are not at threat.

6. Sometimes repositioning the stone in the existing socket will be sufficient to keep it standing, although additional packing stones may be required to secure the stone.

7. Where the existing socket has eroded or been damaged in the fall it may be necessary to consider enhancing the socket. Options may include deepening the socket where this will not fundamentally affect the appearance of the stone, or fabricating a shoe out of modern materials, such as concrete, with a membrane to separate new material from the stone.

8. A careful strategy for lifting fallen or leaning stones should be developed, to prevent damage. Ground protection may be required for any machinery used for lifting.

6.4 Low masonry remains

1. Works to culturally significant remains that survive at low height should generally follow the principles highlighted above for mass masonry monuments. Due to their low height it may often be appropriate to consider greater use of techniques identified for earthworks, however.

6.5 Historic graveyards

1. Most modern graveyard maintenance is not grant eligible. However, there will occasionally be very important graveyards (such as scheduled historic ones), gravestones, graveyard furniture or where destabilised gravestones are threatening other assets or access to them, where grant may be considered. An understanding of the graveyard's (and/ or their features) cultural significance will be needed to demonstrate the eligibility for grant. Works are likely to include conservation of significant stones (refer to Section 7: Carved stones), conservation of boundaries to protect significant gravestones or significant structures, such as churches, or where boundaries form an important part of an asset's overall cultural significance, etc.

6.6 Metalwork

1. Many monuments will include historic metal fixings or features. Some industrial monuments may be almost entirely composed of metal machinery. Especially if exposed and/or include delicate mechanisms, these can be highly vulnerable to rust and/or other forms of erosion and decay. Conservation measures to arrest decay should be informed by a thorough understanding of its cultural significance, risk, and the potential impact of applied materials.

2. Where specialist coatings are advised, these often need to be regularly applied.

3. Brushing down of rust should generally be resisted unless there is a high public footfall.

4. Where removal of parts is recommended as the most preferred way to provide a long-term stable environment, for health and safety and/or to preserve highly significant features, this should usually only be to an accessioned museum collection and fully recorded.

6.7 Ground care and vegetation

6.7.1 Reseeding

1. If grass areas have to be reseeded, for example to inhibit erosion, this should generally be done without breaking into ground surfaces, other than by light scarification.

2. In some cases planting may be required in order to introduce specific species, such as to bind moving ground surfaces.

3. The species selected should be considered to avoid changing the biodiversity of the site.

6.7.2 Growth of other shrubs and ground cover

1. Heather or other shrub type growth may be appropriate if it is already a feature of the site, does not obscure features or does not have deep invasive roots damaging underlying archaeology.

6.7.3 Control of shrubs and woody growth

1. Vegetation and plant growth should generally be controlled to ensure roots do not damage or obscure earthworks, structures, or sub-surface archaeological deposits and, in some cases, enhance access. In most cases this should be cut off at the ground level and removed from the sensitive area: burning of vegetation is only suitable in specific circumstances.

6.7.4 Management of trees

1. Where tree growth is creating identifiable and foreseeable damage to earthworks, either through root penetration or the risk of wind-throw, trees may be removed, noting any protection orders on the specific tree or other natural heritage or visual character considerations.

2. Where trees are to be cut down, it is important that this is done in a way which will not cause damage to ground surfaces and the underlying archaeology. Usually, trees should be cut off at ground level, with roots or stumps, with felled material disposed of away from the monument.

3. Further growth from stumps should be prevented; in most cases it is less damaging to leave the root system in the ground, but the stump mass itself can be removed by stump grinding the main bole if required.

4. Ground protection may be required during works for sensitive elements of the monument.

5. Where possible, machinery wheels or tracks should be kept out with the sensitive area. If this is not possible, the ground loading of any machinery should also be considered.

6.7.5 Planting

1. Generally, planting on sensitive archaeology or where it will affect a monument's character or setting, should be resisted.

2. New planting, if approved, should be considered depending on species, potential spread of roots, the nature of the monument, and any archaeologically sensitive areas. Some monuments may also be

points of interest within a designed landscape, and the effect upon the landscape of any planting should influence decisions.

6.7.6 Grazing

1. Larger grazing animals can pose a threat to some monuments, especially if they are vulnerable or affected by poaching in wet ground conditions, such as earthworks, standing stones or masonry monument. In these cases consideration should be given to putting in appropriate grazing management controls.

2. The grant eligibility of items that help control grazing stock, such as fencing, or the reinstatement of existing stone walls may be considered on a case-by-case basis (refer to **Section 6.8: Boundaries**).

3. The archaeological and setting implications of stock control measures need to be weighed against the management benefits. Access points, ground conditions, potential impacts and possible visitor conflict issues should be identified and considered.

6.8 Boundaries

6.8.1 Adjacent drystone walls

1. Where there are existing walls that do not have cultural significance in themselves but are necessary for the protection of the monument , such as for access or stock management, they should be maintained in a manner that retains the local characteristics of such work, through proper use of tie stones and capping arrangements. Drystone walls should not be removed unless there are special reasons for doing so.

6.8.2 Fencing

1. Ideally, if required, new fences should always be erected well away from the monument and its identifiable context, both to reduce the risk to the underlying archaeological remains and to avoid visual intrusions in the monument's setting. If this cannot be achieved, care should be taken to avoid and reduce impacts on upstanding features and sensitive archaeological deposits.

2. Fence posts should generally be driven cleanly into the ground rather than set in excavated holes.

6.9 Active erosion

1. In some low-lying areas, flood plains and shorelines, a monument may be under direct threat from loss due to erosion. Where historic fabric, archaeology or sensitive adjacent ground is threatened, consideration may be given to the grant eligibility of appropriate measures to mitigate the loss. management of loss.

6.10 Water management

The grant eligibility of proposed works around the management of water will be considered on a case-by-case basis.

6.10.1 Drainage

2. Where drainage is necessary to protect a monument this can be considered as part of a grant aided project. Care should be taken to ensure any new drainage has minimal impact on a monument's cultural significance, this should include avoiding areas of known structures or archaeology and key views, or limiting its extent, depth and/or visual appearance. Appropriate archaeological assessment m may be required to inform the design process but will not be eligible for our grant.

SECTION 7: CARVED STONES

This section refers to a variety of carved stones, including prehistoric rock art, carved on the living rock, the art depicted on Pictish stones, Christian crosses, inscriptions and memorials, statues, other forms of architectural decoration and others. These can have a more complex cultural significance than other forms of historic environment asset and their conservation often presents a wide variety of differing challenges.

7.1 General principles

1. The first stage of any project should seek to establish that a carved stone's cultural significance. In addition to artistic, historical, archaeological, and spiritual associations it is important to consider how the significance of the asset may have changed over time and what they might mean for modern communities. This includes how a carved stone may have been used, moved, presented, and interpreted at different times since it was first created. They can be as, if not more culturally significant in a relocated position.

2. Many carved stones are movable or vulnerable to theft or environmental degradation. Change may be required to secure them.

3. Ideally, carved stones should be retained at the location where they are found, where they can be viewed in context. However, their current location is not always the best for their long-term conservation.

7.2 Cleaning of vegetation

1. Stones can often be best preserved if left in a stable condition. Removing material (including leaves, grass cuttings, turf, soil, lichen, or moss) from carved stones may make them more legible but this can make their carvings more vulnerable if they are to quickly return to their former state or if the stone itself is soft or unstable. Any decision to clean them should take this into consideration.

2. Many lichens cause no damage to stone and may, in some circumstances, have a protective effect. Some do cause damage and where they are, consideration can be given to their removal.

3. Some lichens are rare so the advice of a lichenologist should be sought before removing lichen or relocating a stone with lichen on it. It is also necessary to check in advance whether the type of lichen is protected by law.

4. Moss can have a protective effect, especially on flat carved stones, and should only be removed where there is clear evidence that the growths are having a detrimental effect on the integrity of the

stone, as may be the case with many softer stones, especially if they are upright.

5. If cleaning a carved stone is required and where this will not be damaging this can be done with a soft bristle brush or wooden spatula and rinsing with clean water.

6. Biocides can damage stone surfaces and carvings and should therefore be resisted.

7.3 Conservation works

7.3.1 Applied conservation works

1. For more vulnerable fractures in stones, or carvings suitable, reversible resins may be a suitable method of restoring stability.

2. In more extreme cases, dowels, harder resins, or lime mortar may be considered.

3. Recutting or painting inscriptions or carvings should generally be resisted.

7.3.2 Lifting and moving

1. Lifting stones should only be done with a full understanding of the stability and risk to the stone and should not be done where a stone may be liable to break or fracture without suitable procedures in place.

2. Where equipment is used, suitable supports and protection may be necessary to do this without placing the stone at risk.

7.3.3 Structural supports and mounting

1. Where carved stones require to be made structurally stable by placing them on a mount, this should not involve any physical destruction or abrasion of the fabric of the stone.

2. Mountings for carved stones should be sympathetically designed and constructed so as to facilitate future easy removal.

3. Cushioning should be provided as an interface between a metal support and carved stone to prevent abrasion damage.

4. If metal is being used for brackets, non-ferrous metals (and 316 stainless steel) are recommended for outside or humid conditions; in a dry internal environment a coated mild steel may be acceptable.

5. Where presentation and mounting of the carved stone requires parts of the stone to be reformed, or stone fragments to be joined, the modern fabric should be identifiable on close inspection and should not be aesthetically invasive. All materials should be

compatible. Reconstruction should generally be avoided unless there is very good evidence or other good reasons for doing so.

7.4 Stone shelters

1. Stone shelters are often the best, cheapest and/or easiest way of providing long-term protection for carved stones, close to their existing location and where they can be adequately presented.

2. Their design should seek to create the best achievable environment for the carved stone with due regard for the surrounding conditions and location. Basic shelters will normally focus on involve keeping water away from the carvings. Some form of drainage or water permeable base is often necessary.

3. For larger or more complex shelters, greater care will often be needed to ensure a stable environment (with a way to avoid a buildup of damp, hot or cold conditions).

4. Ideally as much of the carved stones as possible should be visible. Care should be made not to obscure the carvings.

5. The design and location of a new shelter or shelter within an existing structure should seek to avoid visual or direct impacts on nearby historic environment assets. Any foundations should seek to avoid, minimise, or mitigate any damage to other historic features or sub-surface archaeological deposits.

6. Natural lighting can be often used to enhance the readability of carvings, such as by placing stones at an angle to the direction of the sun, especially lower relief carving. If electric lighting is desired to enhance this, then care should be taken to avoid archaeological impacts for cables, fixings, etc.

7.5 Relocating carved stones

1. In extreme circumstances, where there is no suitable alternative to provide a long-term stable environment for outdoor carved stones, moving them in to an appropriate and close-by building can be considered. Ideally, any new location should have some association with the carved stone's original location and be accessible to the public (e.g., local museums, council offices, churches). Proposals should seek to ensure good lighting, access and, where applicable, interpretation.

2. It will be essential to consider the long-term viability and access of the new location and continued maintenance. Where possible, this should be achieved by accessioning the carved stone to a museum collection, to ensure responsibility for care and maintenance should the new location become no longer viable.

7.6 Burial or re-burial

1. In some circumstances, especially where carved stones have recently been uncovered and/or are vulnerable to erosion from weather, footfall and/or vandalism burial/reburial may be appropriate. Ideally, any soils should be ph. Neutral, freely draining and brought in from somewhere that is archaeologically sterile.

7.7 Recording and replicas

1. If moving a carved stone, the location prior to being moved and the new location should be fully recorded, with details sent to the NRHE and local authority SMR. This would not be grant-eligible.

2. Ideally some way of presenting a long-term record of the original and moved location should also be presented at the pre-existing location and may be grant-eligible. An example of this would be to provide a replica or marker. Replicas should be clearly legible as not being the original. Ideally replicas should be placed in the position of the original to ensure the context and setting of the original are fully appreciated.

3. Where a carved stone is to be partially or wholly buried or lost from sight consideration should be given to digital 3D recording, ideally via laser/ structured-light scanning or photogrammetry. This will enable future appreciation and research, as well as condition monitoring.