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Our aim is to protect, conserve and promote the natural and built environment for the benefit of present and future generations.



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INVESTOR IN PEOPLE

Dealing with vegetation on historic masonry monuments

Protecting historic monuments guidance booklet

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PROBLEMS CAUSED BY VEGETATION

A dense covering of vegetation, usually trees and ivy, is a common feature on many ruined, historic monuments. Established vegetation can cause irreparable damage to historic monuments, through root damage, displacement of wall fabric and abrasion against monuments due to wind action. In some cases, the extent of the damage caused by unchecked growth can eventually present safety problems for visitors and adjacent dwellers.

NATURAL HERITAGE INTERESTS

In some cases plants growing against or on masonry may be of botanical or historical significance. If identified, such plants should be retained but their growth must be checked by appropriate pruning. If the plant is listed on Schedule 8 of the Wildlife Order (Northern Ireland) 1985 a licence must be obtained from NIEA before the plant is pruned. Small flowering plants may be left without causing damage to the masonry, but all woody plants must be removed. Care should also be taken during the removal of vegetation that nesting birds or bats, which are all protected species, are not disturbed. Please see Time of Treatment section below.



Derryloran Church Co.Tyrone before conservation



Derryloran Church Co.Tyrone after conservation



Damage to masonry by growing ivy

IVY

Ivy can be very destructive to historic monuments. At first, it will not generally harm upstanding masonry where walls are intact and showing no cavities. In these situations, ivy mattes growing up the masonry faces act as protective barriers from the elements and pollutants. The feeding roots of ivy are anchored into the ground, and the plant uses the monument for support.

However, progressively, on ruined masonry where the wall bonding is weakened and failing, ivy can grow through the wall fabric. In such cases, ivy stems grow and expand within the wall, displacing areas of masonry and causing collapse. Subsequent open joints permit water to penetrate the fabric of the wall causing further damage. In these cases conservation repair work needs to be carried out to remove the ivy growth and to waterproof the walls by capping and pointing in an appropriate manner.

Masonry on historic monuments can be loose and unstable. In some cases ivy may actually be holding the existing wall fabric in place. Ivy and other vegetation must be in a decayed state before removal, and should not be removed at all unless conservation of the monument is already in progress. Depending on the extent of the ivy growth on the monument, it can take up to two years for ivy to be successfully and appropriately treated, prior to the start of conservation work. Below are the steps that should be followed to treat vegetation in such cases in a safe and responsible manner.

STEPS FOR TREATING IVY

1. Cut away or trim any vegetation that can be easily removed from, and around, the monument, including trees, shrubs etc. Ivy should be cut back as close to the face of the monument as possible, without endangering the integrity of the historical remains or creating a health and safety risk to the personnel undertaking the work.
2. This trimmed face should then be sprayed immediately with an appropriate herbicide, (see details below). Ivy roots and shoots can seal themselves within an hour once damaged, and so must be sprayed as soon as possible.
3. The main ivy stem(s) should be cut at the base of the root, removing a piece at least 300mm in length. This effectively cuts off the water supply to the plant. The size and unpredictability of chain saws, even when used by trained personnel, make them unsuitable for this task. A hand saw is appropriate, taking care not to let the saw strike the vulnerable masonry. If the root is small, it should then be painted or sprayed immediately after cutting with the chosen herbicide. If the root is of reasonable size, up to 200mm in diameter, drill a hole into the stump 80mm long and fill with the herbicide solution, then plug. Should the root be wider than 200mm, a series of holes can be drilled into the stump, making sure the holes are at least 30mm in from the cambium (the formative layer of cellular tissue that lies between the young wood and the outer surface layer). The herbicide solution should then be poured in and the holes plugged. Once the main root has been cut, secondary roots may attempt to burrow invasively into the weaker areas of wall fabric to access moisture naturally present in the walls. Immediate spraying will prevent this damage occurring.



Historic masonry walls before treatment

4. The vegetation should then be left to die away naturally. It can take up to two years before it has decayed sufficiently to ensure safe removal. The state of the vegetation should be periodically checked as it may require a second treatment during this time, and perhaps again a few weeks prior to removal.
5. The plant must never be removed from walls while still alive. Once the stems have died, they should be removed with the utmost care by hand, not with a rope or any other means, in order to avoid damage to the monument or possible collapse of loose masonry. On areas of loose masonry, ivy mattes are often keeping masonry sections in place. Therefore it is best to leave the withered ivy on the wall until the conservation work on that respective wall section is being undertaken.

DISPLACED MASONRY



Displaced stones need to be recorded, removed & reset

Large ivy roots can penetrate through to the heart of masonry walls, displacing stones. In such cases it is not advised to bury them within newly repointed masonry. Decayed roots will leave voids providing areas where moisture can penetrate and cause further damage, possibly affecting the setting of new mortar. Even small pockets of roots can re-establish themselves causing future damage. It is, therefore, important to make sure that all root material has been removed before repointing takes place.

Dismantling of masonry around large roots may be required which involves the removal of the root and resetting of the original stonework. If stonework does need to be removed in order to get to roots deep within the masonry fabric, the original position of stones must be recorded by photograph and scale drawings as necessary. Individual stones should be numbered using a water-based paint, and the numbers annotated on the photographs and/or drawings to facilitate accurate resetting.

The stonework can then be carefully removed. In such cases, archaeological supervision is necessary. All removed stonework must be stored on a flat surface, away from other work activities, in order to protect the masonry. In complex situations, this work may need to be undertaken in stages, perhaps months apart, giving large roots time to decay and new adjacent mortar to set.

HERBICIDE

Only approved herbicides (pesticides used to control unwanted plants) may be sold or used. Approved pesticides are given either a MAFF number (up to 09999) or a MAPP number (10000 and over). Pesticides are approved for specific fields of use, and should not be used outside the locations for which they are specifically developed.

Products suitable for vegetation removal on and around masonry monuments will contain the active ingredients either glyphosate or triclopyr.

Glyphosate is non-selective; therefore it will target all vegetation with which it is in contact. Triclopyr controls woody and broad-leaved species (such as ivy) but will have minimal effect on surrounding grass, for example.

Recommended strengths of glyphosate:

For cutback vegetation [foliar application]: 200ml of concentrate to 10 litres of water (2%)

For root/stump application: 1.5 litres of concentrate to 10 litres of water (15%)

Recommended strengths of triclopyr:

For cutback vegetation: 70-150ml of concentrate to 10 litres of water (0.7-1.5%)

For root/stump application: 2 litres of concentrate to 10 litres of water (20%)



Elevation showing ivy after herbicide treatment

These herbicides can be used in conjunction with an approved adjuvant, which reduces surface tension and assists in the absorption of the herbicide into the plant, increasing the effectiveness of the herbicide. Adjuvants are often referred to as “wetting agents”.

Approved herbicides and adjuvants can be obtained from garden centres or DIY stores. Advice should be sought from the supplier. Many outlets will have a BASIS registered member of staff, who is trained to advise on the use of pesticides. These individuals can assist with any particular queries regarding products, strength of solutions and mixture of herbicide and adjuvant required for each specific task.

HEALTH AND SAFETY

All products must be used in accordance with the product label statutory conditions, including maximum dose rate, time of year for latest application, maximum number of treatments and application in the correct fields of use. It is an offence to use a product in any way other than that as stated on the label, or to use a product that has not been approved.

Before commencing any work on historic monuments, it is essential to ensure that there are no areas of loose or dangerous stonework, soil or debris that may cause injury to those undertaking the vegetation treatment.

The Health & Safety at Work Order (NI) 1978 and the Control of Substances Hazardous to Health Regulations (NI) 2002 requires employers to:

- Conduct a suitable risk assessment in relation to the use and method of specific pesticide products.
- Implement control measures to minimise risk to operators and others who may be affected.
- Provide suitable instruction and training, for example to the National Proficiencies Test Council standards.



Loose stonework can present a safety hazard

All operators must have received adequate training, information and instruction in the storage and use of approved pesticides. Necessary certifications are:

PA1 (Foundation Module), concerning the handling of pesticides, and one other, dealing with the method of application. In the case of historic masonry monuments, the one most likely to be required is PA6 (Hand Held Applicator).

Those exempt from certification are:

1. Those spraying on the land/monument directly owned by them. They are personally liable, therefore, for their own health and safety.
2. Those under the direct and personal supervision of a certificate holder.
3. Those under "Grandfather rights" i.e. born on or before 31st December 1964.

It is advised that products with the lowest COSHH hazard rating should always be used. Therefore glyphosate products with no hazard rating should be preferred to triclopyr based products which are rated as Irritant or Harmful. However, each case must be assessed on its own merits, for very thick ivy growths triclopyr based products may be more appropriate. Advice from the supplier is therefore recommended.

TIME OF TREATMENT

Frost and drought limit the effectiveness of glyphosate, while products containing triclopyr are most effective during summer months. However, other issues must also be taken into consideration before vegetation is treated. Nesting birds and roosting or hibernating bats will often use dense ivy. It is an offence under the Wildlife (Northern Ireland) Order 1985 to intentionally damage or destroy a wild bird's nest, whether in use, or under construction. The same Order protects bat roosts, and the Conservation (Natural Habitats etc.) Regulations (Northern

Ireland) 1995 make it an offence to damage or destroy a breeding or resting place of any bat, it does not require the offence to be intentional or deliberate. Each situation must therefore, be assessed on its botanical and wildlife impacts. In general the best time for ivy treatment is late summer/early autumn, when the vegetation will still be active, but the possibility of adversely affecting wildlife is reduced.

MAINTENANCE

Ivy is a perennial plant and will always return. Regular annual maintenance work to deal with ivy growth on masonry monuments is recommended. This will ensure that minimal damage to the masonry monument is caused by vegetative growth and attention can be brought to any other maintenance issues that emerge from time to time.

WALL TOPS

NIEA often recommends hard capping of wall tops using an appropriate lime mortar mix. However, work specifications are drafted uniquely for each site and, in certain circumstances, soft cappings (grass, sod) can be deployed. This method should be used on sites with a delicate ecology, where the introduction of lime mortar capping may change the ecological balance of the site. It will also be employed on monuments constructed with very soft, porous stone, such as lias or mudstone. Hard capping on top of such walls will increase water run-off down the masonry, which would result in increased erosion of the upstanding remains.



Tree roots can dislodge wall tops

TREES

Occasionally trees root themselves onto wall tops. These need to be cut at their base and treated with herbicide in the same manner as ivy stems. Trees growing adjacent to masonry monuments can also cause disturbance to the walls, by root action or by abrasion, as well as posing a threat of falling during very windy weather. In such cases, tree removal or cutting of some branches may be necessary. Regular monitoring is advisable as certain species, such as sycamore and ash, grow extremely quickly.

GROUND VEGETATION

Conservation work often necessitates the removal or trimming of vegetation from around the base of masonry buildings. This usually reveals a large number of loose, fallen stones. Because of this, ground vegetation should be removed using a strimmer, which will ensure that any loose masonry on the ground remains visible but undamaged.

Any fallen stonework should be recorded in its exact location, as it may be important in the understanding and conservation of the masonry fabric. Sometimes the original position of fallen stones can be deduced, and they can then be reset during the conservation works.

Carved and worked stones are precious and require careful handling. Modern material, such as decorative wrought-iron railings, may also come to light, particularly on church sites. They are an important part of the historical record of the site, and must be treated carefully.

On some sites, certain areas may be known to contain fragile buried archaeological remains, or visitor access to particular areas may be detrimental to site preservation. In such cases the “hostile planting” method can be used.



Adjacent trees can sometimes be a threat



Dense vegetation mattes can flourish on neglected monuments

This involves the dense planting of nettles or brambles. These species do not have deep, invasive root systems that can damage below ground surface remains, but will act as an effective deterrent to climbers or metal detectorists. When dealing with scheduled monuments, Scheduled Monument Consent (SMC) with the relevant conditions must be granted by NIEA for this work to be undertaken.



Regular maintenance is important to conservation

LICHEN

It is generally believed that lichen is not detrimental to undecorated masonry or headstones. Lichen forms part of the natural appearance of many stones and some lichens are rare and should be recorded and preserved. Lichen should never be removed by crude method of cleaning such as using wire brushes and detergents or bleach that can cause irreparable damage to the stone face. However, the living processes of lichen can attack the stone surface and can lead to subsequent deterioration. Therefore lichen can be cleared off decorated stonework by the selected application of an approved biocide, which is recommended in particular cases. This is not an instantaneous process and it can be many months before treatment will be fully effective. Further advice can be obtained from NIEA when necessary.

FURTHER INFORMATION

The Northern Ireland Health and Safety Executive
www.hseni.gov.uk

Pesticides (Non Agricultural) Safety Pays Information Sheet
(available from HSENI).

Control of Substances Hazardous to Health Regulations (NI) 1995,
Approved Codes of Practice (available from HSENI ISBN
0-7176-0819-0).

Pesticides – Use Them Safely, a free leaflet available from
HSE Books (www.hsebooks.co.uk)

The Biocides and Pesticides Assessment Unit, HSE, Bootle,
Merseyside.

Building Research Establishment (BRE) Digest 418 “Bird, Bee and
Plant Damage to Buildings”, September 1996.

Other information and advice can be obtained from NIEA Built
Heritage.

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Benburb Castle Co. Tyrone before
conservation



Benburb Castle Co. Tyrone after
conservation

