Castle Earthwork
200m South of Coed Caeau
Scheduled Ancient Monument BR179

Completion Report

Aerial Photograph of the Monument in 2007 © RCAHMW

Glastir Customer Reference Number (CRN): A0001260
Farm Name: Neuadd, Erwood, Builth Wells LD2 3PX

Context

This Completion Report is prepared by AQB Historic Landscapes, on behalf of Mr Morgan, Pool Hall, Crickadarn, the owner of Neuadd, Erwood and the Castle Earthwork 200m South of Coed Caeau Scheduled Ancient Monument BR179, located at National Grid Reference SO 05914 41269.

Mr Morgan entered into a Glastir Advanced agreement with the Welsh Government, as part of which he undertook to meet the requirements of the Scheduled Ancient Monument Management Plan prepared by Dr Amelia Pannett, Cadw, in June 2014.

This Completion Report describes repair works undertaken between Saturday 18 July and Wednesday 22 July 2015 to fulfil Mr Morgan's obligations under the Scheduled Ancient Monument Management Plan and his Glastir Advanced agreement.

Scheduled Monument Consent under the Ancient Monuments and Archaeological Areas Act 1979 Section 2 and Schedule 1 was granted by Cadw for the described works on 15 April 2015.

The repair works described were undertaken by Stonewycs Cyf., project-managed by AQB Historic Landscapes.

The Works

Condition prior to repair

The works described in this Completion Report addressed three of the principal areas for concern and the associated prioritised management works identified in the Scheduled Ancient Monument Management Plan ('Category 3 Works'), and described therein as follows. All other concerns and associated prioritised management works described in the Scheduled Ancient Monument Management Plan were addressed separately by Mr Morgan:

Concerns:

1. *The site has 11 sizable sheep scrapes that are actively eroding. Vertical erosion scars are unlikely to recover naturally (due to the combination of gravity, wind, rain and stock) and require in-filling and re-seeding. The scrapes are shown as numbered red dots and a line on the plan following and are detailed as follows:*

   1. Located on the SE side of the eastern inner bank. Measures 2.3m long by 1.4m deep and 0.4m high;

   2. Located 2m to S of scrape 1. Measures 2.7m long by 1m deep by 0.35m high;

3. Located on SW side of eastern inner bank. Four separate areas which are being used by sheep and are starting to erode;

4. Located immediately at break of slope on inner edge of ditch on S side monument. Measures 1.9m long by 2m deep and 0.2m high;

5. Located midway down inner ditch edge on S side monument, immediately below scrape 4. Measures 2.4m long by 0.6m deep and 0.5m high;

6. Located at base of inner ditch immediately below scrape 5. New area of erosion measuring 0.7m long by 0.3m deep and 0.5m high;

7. Located on the NW side of the monument, at the break of slope on the inner edge of the ditch. Measures 3.7m long, 1m deep and 0.5m high;

8. Located on the bank above the ditch on the northern side of the monument. Measures 11m long by 2m deep and 0.5m high;

9. Located 12m to the SE of scrape 8 on the bank about the ditch on the NE side of the monument. Measures 7m long by 2m deep and 0.4m high;

10. A group of interconnected scrapes on the outer edge of the ditch on the eastern side of the monument. Collectively they measure 6m long by 1.5m deep and 1m high;

11. A line of small scrapes and erosion scars along the top of the outer bank on the eastern side of the monument.

2. *There are a number of areas where the first signs of erosion are evident*;

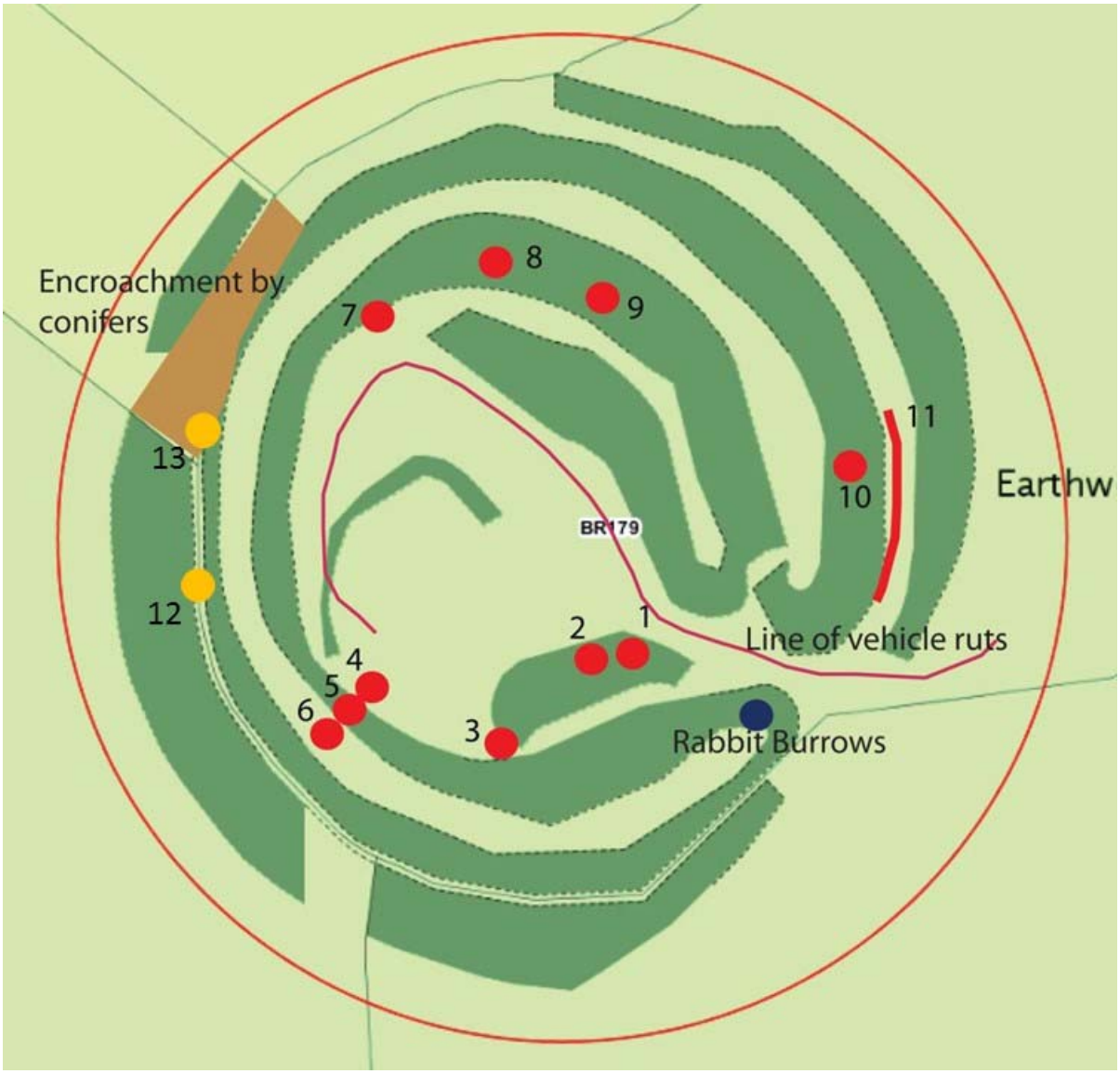
3. *On the NW side of the monument a conifer plantation has encroached on the external bank, with roots from a number of trees growing through the earthwork. The trees appear dilapidated and, should they fall, could cause considerable damage to the monument by removing material within the root plate. Dilapidated trees may shed limbs in the direction of the earthwork remains where they might cause damage. The overhanging branches also reduce light levels at the ground surface and inhibit the development of a grass sward.*

Prioritised management works:

- *Fill, re-profile and re-seed all the sheep scrapes on the monument, ensuring the long-term stability of the earthworks and excluding stock until the repairs have established*;

- *Fell plantation conifers within the scheduled area to prevent further damage to the earthwork caused by roots and to guard against more serious damage through trees falling. Removing the conifers will also enable the grass to regenerate in the western ditch.* The felling work was undertaken by Mr Morgan prior to the conservation works described in this Completion Report being carried out.

The Scheduled Ancient Monument Management Plan includes a map locating the works, which is reproduced here in modified form:



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Locations 12 and 13, shown in orange, indicate erosion scars that were repaired as part of the project described in this Completion Report, but which are not included in the Scheduled Ancient Monument Management Plan (June 2014).

Topsoil and transport method/route

A screened, graded and blended multi-purpose topsoil was supplied in 750 kilograms liftable bulk bags by Dandy's Topsoil, Yew Tree Farm, Sealand Road, Chester, CH1 6BS.

27 bags (20.25 tonnes) were delivered to the yard of John Jones Civil Engineering and Groundworks Ltd at Erwood Bridge by articulated lorry on 17 July 2015, from where that company transported the bags to site by New Holland Ford 7840 tractor and flatbed trailer on 18 July 2015 (see image below). The topsoil was stored in two base locations away from the Monument, but sufficiently close to minimise subsequent vehicle movements in transporting bulk bags to work areas.

New Holland Ford 7840 tractor and flatbed trailer, IMG_7450, 18.07.2015

The flatbed trailer was offloaded by JCB 535-95 Loadall 9.5 metres reach telehandler, fitted with pallet forks, to two base locations situated to the east of the Scheduled Ancient Monument (see image below).

JCB 535-95 Loadall, IMG_7444, 18.07.2015

The telehandler was used to move individual bulk bags to accessible repair areas where the bags, still suspended from the telehandler's pallet forks by their lifting loops, were slit open to enable soil discharge (see image below).

Delivery of topsoil to accessible erosion scars by JCB 535-95 Loadall, IMG_7450, 18.07.2015

For less accessible erosion scars, bulk bags were moved to the closest possible accessible location by telehandler, from where the topsoil was manually moved to the scars using shovel and rubble tubs.

The access route to site from the public highway for tractor/trailer (A) and pick-up/trailer (B); and, topsoil base storage locations (C1 and C2) are indicated on the plan below.

Access routes to site for tractor/trailer (A) and pick-up/trailer (B); and, topsoil base locations (C1 & C2). Base Image © 2015 Getmapping plc and Google Earth

The repairs

At all erosion scar locations shown on the plan above (with the exception of Locations 3 and 11, discussed below) repair was undertaken to the following specification:

- The extent of each eroded area was infilled using imported topsoil, the surface of the area, after repair, being coincident with the adjoining ground surface. Imported topsoil was mixed with Broadleaf P4 (see Appendix 1) at a rate not exceeding 1 kilogram per cubic metre, to aid sward re-establishment;

- The repaired area was sown by hand broadcasting with a drought-tolerant grass seed mix comprising 35% tall fescue *Festuca arundinacea*, 35% rhizomatous tall fescue and 30% Topgun dwarf perennial ryegrass *Lolium perenne* at a rate of 35 grams per square metre;

- The repair was then covered with Greenfix Eromat Type 6S (see Appendix 2), the matting being laid so as to extend beyond the repair by no less than one metre. This matting was secured to the substrate using a combination of 100 mm and 150 mm Green Stakes (see Appendix 3), at a density not exceeding six per square metre. The use of this matting and these Green Stakes was a modification from the approved Specification for Works (v20 02 2015). This modification was intended to enhance environmental sustainability, together with safe and efficient working, while maintaining repair effectiveness and standards. It was approved by Cadw on 2 July 2015.

The sequence of repair work for each of the erosion scars is illustrated in Appendix 6.

At the time of undertaking conservation works, AQB Historic Landscapes assessed that the erosion scars at Locations 3 and 11 should naturally re-establish a grass sward cover and thereby stabilise. Accordingly, they were treated using sward enhancement techniques, as described below, rather than by infilling with topsoil and matting.

This made available materials to repair two, more significant erosion scars additional to those included in the Scheduled Ancient Monument Management Plan (June 2014), shown as Locations 12 and 13 on the Plan above.

Treatment of areas where the first signs of erosion were evident

For all areas where the grass sward was seen to be under stress (*i.e.* yellowing or burnt leaf blades, low density of grass crowns, with exposed bare soil) (the approximate extent being shown in Appendix 5) the following sward enhancement specification was followed:

- The extent of the stressed area was ‘spiked’ using a standard garden fork, at a spacing of approximately 150 mm and to a depth not exceeding 100 mm;

- Broadleaf P4 was introduced into the holes resulting from ‘spiking’ using a funnel;

- The extent of the stressed area was then treated with an extended release mini grain fertiliser (18% Nitrogen, 3.5% Phosphate, 8% Potassium and 1% Magnesium) applied by surface broadcasting at a rate between 25 and 35 grams per square metre.

At the time of undertaking conservation works, the area of grass sward considered to be under stress was greater than that estimated at the time of preparing the Specification for Works (v20 02 2015). This extended area, as shown in orange on the plan at Appendix 5, was also treated as above.

In addition, gorse and bracken cover was either cut or crushed, using petrol-powered strimmers, with excess material removed from the extent of the Scheduled Ancient Monument.

This latter work was undertaken to reduce competition for light, water and nutrients and thereby optimise conditions for the successful recovery and establishment of a close-knit grass sward. It will also partially reduce the vigour of bracken growth.

Treatment of area of conifer plantation following tree felling

On the north side of the Castle Earthwork conifer trees had been felled from the extent of the Scheduled Ancient Monument by Mr Morgan prior to conservation works commencing, with tree stumps retained *in situ*.

As part of conservation works, a limited amount of remaining brash was removed from the extent of the Scheduled Ancient Monument, with smaller stumps cut to ground level.

Repair of the erosion scar at Location 13 formed part of these works and was infilled and reprofiled.

The extent of the felled area was then treated as follows:

- Sown by hand broadcasting with the drought tolerant grass seed mix at a rate of 35 grams per square metre;

- Covered with Greenfix Geocoir 900 Matting (see Appendix 4), the matting being secured to the substrate using a combination of 100 mm and 150 mm long Green Stakes (see Appendix 3), at a density not exceeding six per square metre.

Post repair protective measures

Following completion of all erosion repair works livestock is to be excluded from the extent of the Scheduled Ancient Monument until such time as Cadw is satisfied that the grass sward across repaired areas has satisfactorily re-established.

Mr Morgan has installed new stockproof fencing to enable this, the alignment of this fencing having been agreed with Cadw so as to remove fencelines from the crest of banks.

Appendix 1

Broadleaf P4

Broadleaf P4 is a high performance, long lasting, hydrophilic (water and nutrient storing) cross-linked copolymer polyacrylamide which has been specifically developed for agricultural and horticultural applications. It is an environmentally safe, non-toxic organic compound that has been 'engineered' to store extremely large quantities of water and nutrients.

Broadleaf P4 absorbs 100-200 times its weight in water in soil, giving back over 95% of the water stored within it directly to plants as they need it via its reservoir-action. In dry form, P4 takes on water and swells to form odourless, colourless hydrogel particles which plant roots grow through.

Broadleaf P4 is 100% biodegradable, its by-products being water, carbon dioxide, and minute amounts of ammonia.

It is mixed with infill soils at a rate not exceeding 1 kilogram per cubic metre.

Broadleaf P4. Image source: www.baldur-nederland.nl

Appendix 2

Greenfix Eromat Type 6S

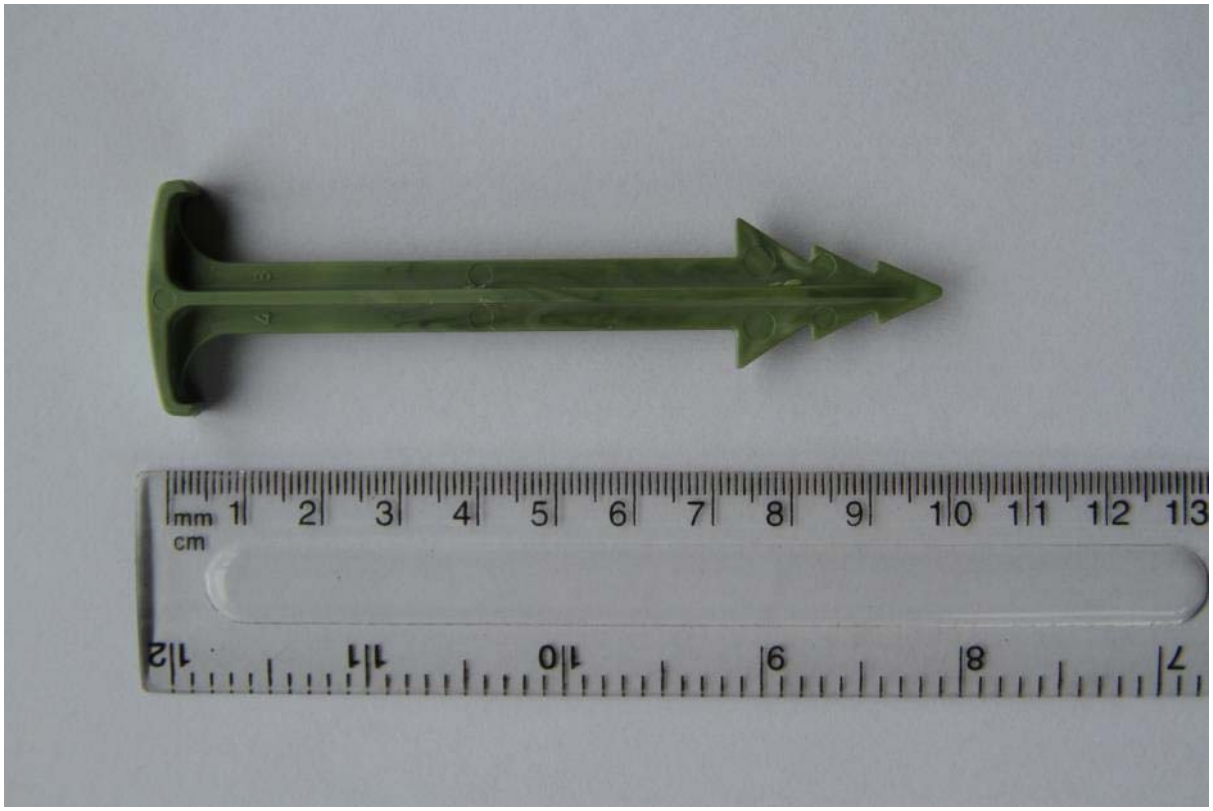
Greenfix Eromat Type 6S is an erosion control blanket comprising 100% coir fibres stitched between top and bottom degradable polypropylene mesh; and, with a density between 400-500 grams per square metre.

It is fully bio/photo- degradable, with an effective operational life of up to five years.

The Eromat is fixed to the substrate using a combination of 100 mm and 150 mm Green Stakes (see Appendix 3), at a density not exceeding (on average) six per square metre.

Appendix 3

Green Stakes



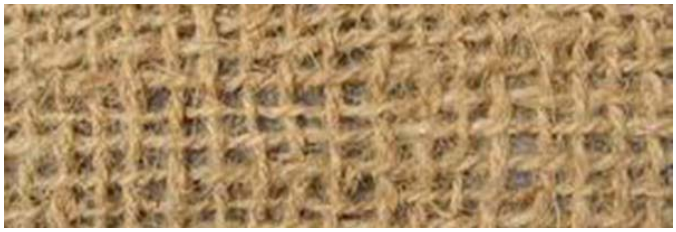
Green Stakes are manufactured from 100% biodegradable wheat and potato starches and biodegradable pigments, with an operational life in excess of eighteen months.

The rate of biodegradation by soil borne micro-organisms is dependent upon soil temperature and moisture content; and, by-products of biodegradation are carbon dioxide, water and humus.

A combination of 100 mm and 150 mm long Green Stakes were used, at a density (on average) not exceeding six per square metre.

Appendix 4

Greenfix Geocoir 900 Mat



Manufactured from 100% high quality bristle coir (coconut) fibres, Geocoir erosion control netting is produced from spun coir twine and provides a strong and durable short- to mid-term protection with an anticipated operational life of over five years.

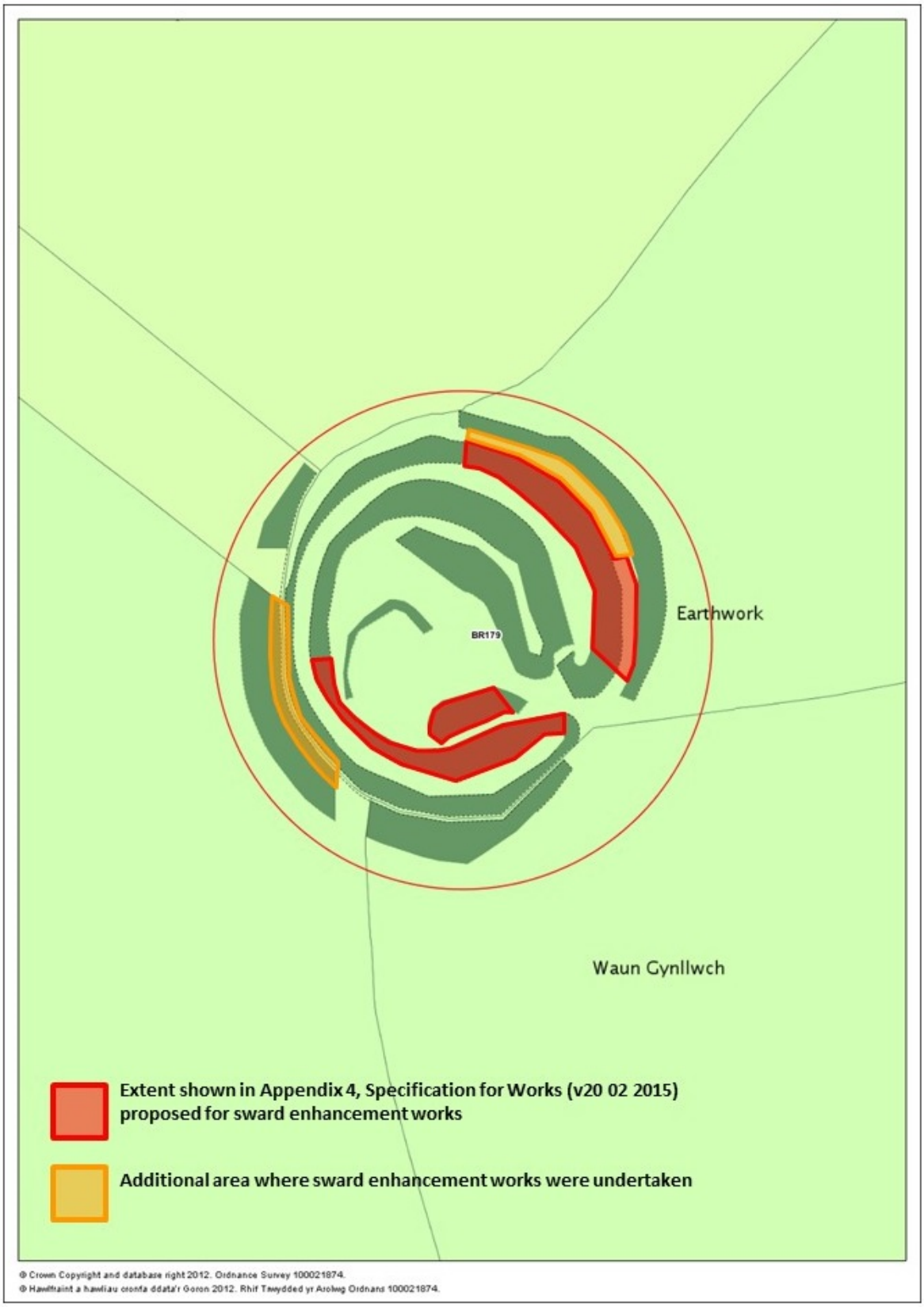
Geocoir provides surface stability to steep and aggressive applications and offers shade and protection from the sun and drying effect of the winds to assist in the establishment of grasses and to reinforce the root system until it has reached full bio-mass.

'Heavy' grade Geocoir matting is specified, with a weight of 900 grams per square metre, mesh size of approximately 15 mm x 12 mm and an open area of approximately 40%.

The Geocoir was fixed to the substrate using a combination of 100 mm and 150 mm Green Stakes (see Appendix 3), at a density not exceeding (on average) six per square metre.

Appendix 5

Extent of areas where the first signs of erosion were evident



Appendix 6

Before/during/after photograph sequence

Locations 1 & 2

Location 1, before repair, IMG_2483, 02.10.2014

Location 2, before repair, IMG_2482, 02.10.2014

Locations 1 & 2, before repair, IMG_7456, 18.07.2015

Locations 1 & 2, infilling and reprofiling, IMG_7471, 20.07.2015

Locations 1 & 2, installing Greenfix Eromat Type 6S, IMG_7478, 20.07.2015

Locations 1 & 2, completed repair, IMG_7485, 20.07.2015

Location 3

Location 3, IMG_2480, 02.10.2014

Location 3, immediately following sward enhancement works, IMG_7645, 23.07.2015

Locations 4, 5 & 6

Locations 4, 5 & 6, before repair, IMG_2470, 02.10.2014

Locations 4, 5 & 6, before repair, IMG_2471, 02.10.2014

Locations 4, 5 & 6, before repair, IMG_7466, 18.07.2015

Locations 4,5 & 6, infilling and reprofiling, IMG_7483, 20.07.2015

Locations 4, 5 & 6, completed repair, 20.07.2015

Locations 4,5 & 6, after bracken strimming/crushing, IMG_7627, 23.07.2015

Location 7

Location 7, before repair, IMG_7465, 18.07.2015

Location 7, infilled, reprofiled, installing Greenfix Eromat Type 6S, IMG_7486, 20.07.2015

Location 7, completed repair, IMG_7628, 23.07.2015

Location 8

Location 8, before repair, IMG_2454, 02.10.2014

Location 8, before repair, IMG_7457, 18.07.2015

Location 8, infilling and reprofiling, IMG_7489, 20.07.2015

Location 8, installing Greenfix Eromat Type 6S, IMG_7493, 20.07.2015

Location 8, completed repair, IMG_7504, 20.07.2015

Location 8, after bracken strimming/crushing, IMG_7630, 23.07.2015

Location 9

Location 9, IMG_2446, 02.10.2014

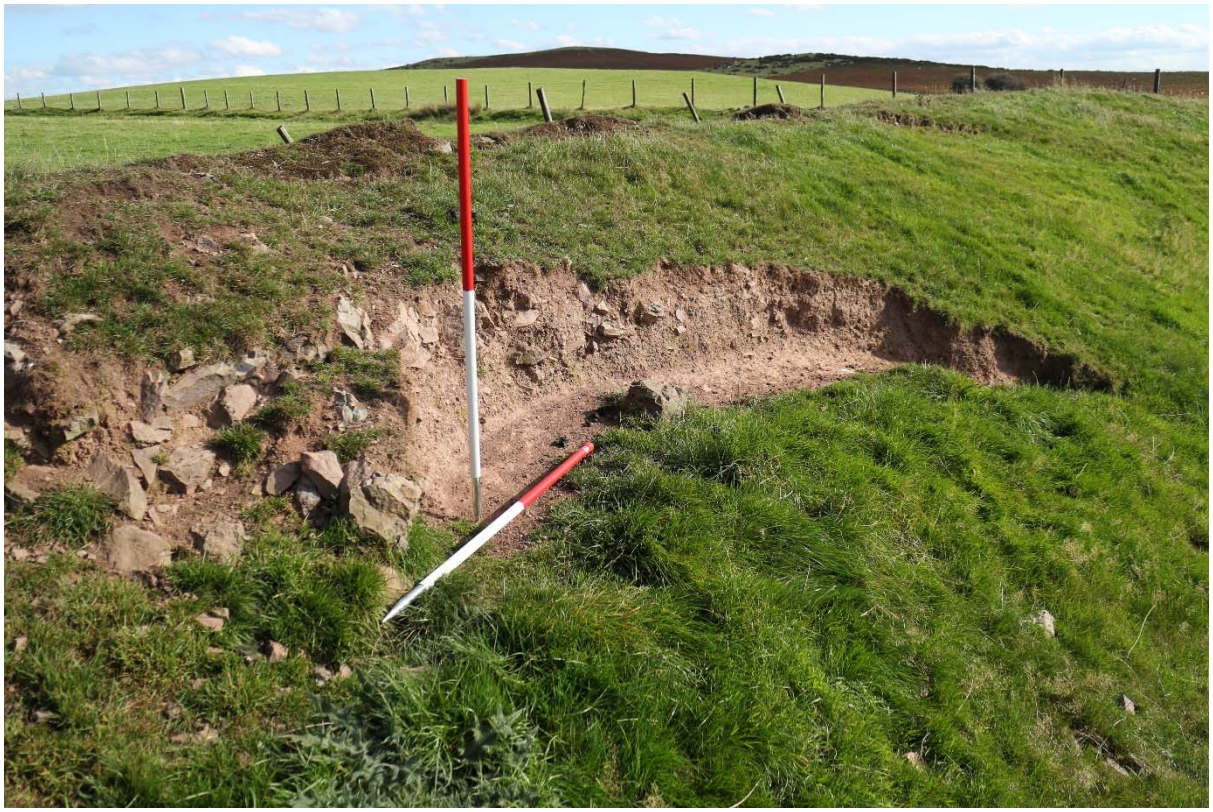
Location 9, before repair, IMG_7458, 18.07.2015

Location 9, infilling and reprofiling, IMG_7507, 20.07.2015

Location 9, hand broadcasting grass seed before installing matting, IMG_7508, 20.07.2015

Location 9, completed repair, after bracken strimming/crushing, IMG_7631, 23.07.2015

Location 10



Location 10, before repair, IMG_2442, 02.10.2014

Location 10, before repair, IMG_7469, 18.07.2015

Location 10, infilling and reprofiling, IMG_7515 20.07.2015

Location 10, installing Greenfix Eromat Type 6S, IMG_7519, 20.07.2015

Location 10, completed repair, IMG_7635, 23.07.2015

Location 11

Location 11, before sward enhancement works, IMG_2506, 02.10.2014

Location 11, during sward enhancement works, IMG_7518, 20.07.2015

Location 12

Location 12, before repair, IMG_7524, 21.07.2015

Location 12, commencing infilling and reprofiling, IMG_7529, 21.07.2015

Location 12, completed repair, IMG_7530, 21.07.2015

Encroachment by conifers

Area of encroachment by conifers, showing underlying bare ground, IMG_2459, 02.10.2014

Area of encroachment by conifers, showing underlying bare ground, IMG_2460, 02.10.2014

After felling and re-fencing by Mr Morgan, looking east, IMG_7533, 21.07.2015

After felling and re-fencing by Mr Morgan, looking west, IMG_7534, 21.07.2015

Installing Geocoir 900 matting, IMG_7537, 21.07.2015

Installing Geocoir 900 matting, IMG_7542, 21.07.2015

Completed repair, looking east, IMG_7620, 23.07.2015

Completed repair, looking west, IMG_7622, 23.07.2015

General views

Looking west, showing Locations 1 & 2, IMG_7615, 23.07.2015

Looking north-west, showing Locations 4, 5 & 6, IMG_7617, 23.07.2015

Looking north, showing Location 12, IMG_7618, 23.07.2015

Looking east, showing Location 7, IMG_7621, 23.07.2015

Looking south-east, showing Location 8, IMG_7623, 23.07.2015

Looking south, showing Locations 9 & 10, IMG_7625, 23.07.2015

Completed conservation works, looking east, ©Richard Stanton Photographic, 23.07.2015