wardell-armstrong.com

ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

J C BAMFORD EXCAVATORS LTD

HAREWOOD ESTATE, CHEADLE

LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN

FEBRUARY 2018

your earth our world

wardell armstrong

Wardell Armstrong
Sir Henry Doulton House, Forge Lane, Etruria, Stoke-on-Trent, ST1 5BD, United Kingdom
Telephone: +44 (0)1782 276 700 Facsimile: +44 (0)845 111 8888 www.wardell-armstrong.com

wardell armstrong
your earth our world

DATE ISSUED:	**February 2018**
JOB NUMBER:	**ST16225**
REPORT NUMBER:	**004**
VERSION:	**V0.1**
STATUS:	**Final**

J C BAMFORD EXCAVATORS LTD

HAREWOOD ESTATE, CHEADLE

LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN

FEBRUARY 2018

PREPARED BY:

Katherine Morley Ecologist

REVIEWED BY:

Emily Macfarlan Ecologist

APPROVED BY:

Caroline Mellor Technical Director

This report has been prepared by Wardell Armstrong LLP with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The report is confidential to the Client and Wardell Armstrong LLP accepts no responsibility of whatever nature to third parties to whom this report may be made known.

No part of this document may be reproduced without the prior written approval of Wardell Armstrong LLP.

Wardell Armstrong is the trading name of Wardell Armstrong LLP, Registered in England No. OC307138.

Registered office: Sir Henry Doulton House, Forge Lane, Etruria, Stoke-on-Trent, ST1 5BD, United Kingdom

UK Offices: Stoke-on-Trent, Birmingham, Cardiff, Carlisle, Edinburgh, Glasgow, Greater Manchester, Central Manchester London, Newcastle upon Tyne, Sheffield, Truro. International Offices: Almaty, Moscow

ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT

CONTENTS

APPENDICIES

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Wardell Armstrong LLP (WA) was commissioned by J C Bamford Excavators Ltd to produce a Landscape and Ecological Management Plan (LEMP) for the proposed development scheme at Harewood Estate, Cheadle, OS grid reference SJ 999 442. Brights & Associates have also reviewed and inputted specifications within this management plan.

1.2 Site Context

1.2.1 An Extended Phase 1 Habitat Survey was carried out by WA on 21st April 2017, to inform the Preliminary Ecological Appraisal (PEA) (Wardell Armstrong LLP, 2017b). The Site comprises approximately 38ha of commercial development with associated hardstanding used for parking, stock storage and finished product layout areas. The remaining areas of the Site comprises broad-leaved plantation woodland, scattered scrub, tall ruderal vegetation, a variety of grassland habitats, buildings and hardstanding, native hedgerows, ponds, running water.

1.3 Relevant Planning Conditions

1.3.1 A planning application (SMD/2017/0400) for car parking, reorganisation of goods in, machine dispatch areas, new machine storage and waste areas, was submitted to Staffordshire Moorlands District Council in June 2017. It was granted planning permission on the 13th November 2017.

Condition 2 states:

"No development shall take place until a Landscape and Ecological Management Plan (LEMP) detailing strategies for mitigation, compensation and enhancement as outlined in sections 4.1.3 to 4.1.5 and 5.1.2 to 5.1.5 of the Preliminary Ecological Appraisal (Wardell Armstrong June 2017) has been submitted to and approved in writing by the Local Planning Authority. The LEMP shall accord with the Landscape Masterplan (Drawing No. JC1103-D6v1 Rev B) and shall include:

i. Purpose and conservation of objectives of the proposed enhancements.
ii. Detailed designs and or working methods to achieve stated objectives.
iii. Extent and location of proposed works on appropriate plans and scale maps
iv. Type and source of material used where appropriate e.g. native species of local provenance.
v. Creation and enhancements of semi natural habitats linked to Staffordshire and

UK Biodiversity Action Plan priorities In particular species rich grassland broadleaved native woodland and scrub plus the enhancement of hedgerows.

vi. *Ponds designed with some surrounding tree planting linked to other created habitats.*

vii. *Timetable for the implementation of works demonstrating that works are aligned with the proposed phases of the development.*

viii. *Creation of bird nesting features sparrows and roosting sites for bats and within created broad leaved woodland on bunds.*

ix. *Specifications to minimise light spill into surrounding hedgerows and the adjacent countryside.*

x. *Lighting must demonstrate minimal impacts on foraging or commuting bats and allow birds species to exhibit undisturbed behaviour patterns.*

xi. *Timing and phasing of any proposed vegetation removal to minimise impacts on breeding birds.*

xii. *Persons responsible for implementing the proposed works.*

xiii. *Details of initial aftercare and long-term maintenance for different habitats for 20 years post creation.*

xiv. *Details of monitoring and remedial measures.*

xv. *Details of disposal of any wastes arising from works.*

The approved LEMP shall be implemented in accordance with the approved details and all features shall be retained thereafter unless otherwise agreed in writing by the Local Planning Authority."

1.4 Purpose of Report

1.4.1 The ecological management objectives within this document are in line with recommendations set out in the published British Standards (2013) BS 42020:2013 *Biodiversity - Code of practice for planning and development.*

1.4.2 A Construction Environmental Management Plan (CEMP) (Wardell Armstrong LLP, 2018) has been prepared for development of the Site to safeguard biodiversity during the construction phase. This document only refers to the creation of new habitats, enhancement of existing habitats and management and maintenance of the Site (for an initial 5-year period; the LEMP will then be reviewed for years 5 – 20).

1.4.3 This LEMP should be read in conjunction with the Landscape Masterplan (Fig L16 Rev B) that accompanies this document (See Appendix 1).

1.4.4 The aims of the LEMP are:

- To create and enhance priority semi-natural habitats[1][2];
- To enhance ecological connectivity within the site;
- To create new opportunities for nesting birds and roosting bats; and
- To minimise disturbance during the operational phase to ecological receptors within the site.

1.4.5 In order to meet the aims, the following objectives have been set:

1. Enhancement of hedgerow habitats;
2. Creation of semi-natural terrestrial and aquatic habitats;
3. Creation of semi-natural aquatic habitats;
4. Provision of bird nesting features and bat roosting sites; and
5. Implementation of a sensitive lighting scheme for nocturnal species.

[1] Staffordshire Biodiversity Action Plan (BAP) priority habitats listed on http://sbap.org.uk/actionplan/habitats/index.php
[2] Habitats listed on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006

2 BASELINE DATA

2.1.1 This section provides a summary of designated sites, priority habitats and notable/protected species recorded within the Site during surveys undertaken between by WA; the Extended Phase 1 habitat survey was carried out on 21st April 2017, and the Great Crested Newt surveys were carried out between 3rd May and 17th May 2017 (Wardell Armstrong LLP, 2017a; b).

2.2 Designated Sites

Sites of Special Scientific Interest (SSSI)

2.2.1 The Site falls within the impact risk zones (IRZ's) for Churnet Valley SSSI (approximately 2.9km north), and Dimmings Dale and The Ranger SSSI (approximately 4.2km north east). Although the Site falls within the IRZ of both sites, it falls within the final two zones of the IRZ and is not listed as a potential risk to the SSSIs.

Cecilly Brook Local Nature Reserve (LNR)

2.2.2 The LNR lies approximately 1.1km south east of the Site. It follows a 1.25 km stretch of Cecilly Brook through Cheadle and is one of the most important sites for water voles in Staffordshire. A ditch in the east of the Site connects with Cecilly brook to the north east, which connects with Cecilly Brook LNR.

2.2.3 Due to ecological connectivity between the Site and the LNR, effluents and increased surface run-off could travel downstream and the nature conservation value of the LNR could be adversely affected.

Hales Hall Pool LNR

2.2.4 The Site is situated approximately 1.4km from the LNR which is a man-made lake designated for supporting a variety of wetland plant species, invertebrates and birds. Due to distance and minimal connectivity between the Site and the LNR, development of the Site will not adversely affect the nature conservation status of the LNR.

2.3 Status of Habitats

2.3.1 The PEA identified the following habitats to be present within the Site:

Grassland

2.3.2 Different types of grassland are present within the site including: amenity, poor semi-improved, marshy and semi-improved calcareous. Amenity grassland is mown regularly and kept as a short sward; poor semi-improved grassland and marshy

grassland are of low floristic diversity, comprising common species. Semi-improved calcareous grassland present on the bund is considered to be a poor example of calcareous grassland due to a low species diversity and lack of indicator species for this habitat. The features of the grassland do not meet the required criteria for s.41 or Local BAP status.

Broad-leaved plantation woodland

2.3.3 The woodland comprises a diverse mix of native species, that are young-early mature specimens and therefore, this habitat is presently of low ecological value.

Scrub and tall ruderal vegetation

2.3.4 There is presently minimal scrub and tall ruderal vegetation within the Site, confined to small areas of the south west and the north. Scrub and tall ruderal vegetation are not s.41 or LBAP priority habitats.

Ponds

2.3.5 Two areas of standing open water are present within the Site, Waterbody 1 and Waterbody 2. Waterbody 1 is small, shallow and is dominated by bulrush *Typha latifolia*. Waterbody 2 is a large fishing lake that supports a variety of emergent plant species, however the presence of large fish species within it may reduce the lake's biodiversity. Waterbody 1 and Waterbody 2 do not currently meet the criteria for s.41 priority habitat status, however they are local BAP priority habitats.

Hedgerows

2.3.6 Hedgerows are present along the north eastern and southern Site boundaries. These hedgerows are species-poor and dominated by hawthorn *Crataegus monogyna*. There are both defunct and intact hedgerows present within the Site; and some with mature standard trees. All hedgerows are listed as priority habitats under s.41. Species-rich and ancient hedgerows are local BAP habitats, however the hedgerows on site do not meet the criteria of local priority habitats.

Running water

2.3.7 A stream is present along the western boundary of the Site and a ditch is present to the north eastern extent of the Site. Ditches are not priority habitats; however, streams are a local BAP priority habitat.

Buildings, hard standing, and bare ground

2.3.8 These habitats within the Site are of no intrinsic ecological value and are not national or local priority habitats.

2.4 Status of Protected Species

2.4.1 The PEA / Phase 2 Surveys identified the following notable/protected species that were recorded, or have the potential to be present, within the Site:

- Amphibians;
- Badger *Meles meles*;
- Bats;
- Hedgehog *Erinaceus europaeus*; and
- Reptiles.

Amphibians

2.4.2 Ponds within the Site and within 500m of the Site were assessed by Wardell Armstrong LLP (2017a, b) as suitable for breeding great crested newt *Triturus cristatus*, as well as other amphibians such as common toad *Bufo bufo*. Grassland, tall ruderal vegetation, scrub and hedgerow bases provide suitable terrestrial habitat for foraging and dispersing amphibians.

2.4.3 Great crested newt surveys were carried out on waterbodies within the Site and within 500m of the Site by WA between April and May 2017 (Wardell Armstrong LLP, 2017a). No great crested newts were observed in any of the ponds. Smooth newt *Lissotriton vulgaris* and common frog *Rana temporaria* were identified in some ponds, however they are not protected or priority species.

Badger

2.4.4 Grassland, broad-leaved plantation woodland, scrub and hedgerow bases provide suitable habitat for badger sett creation, commuting and foraging. Evidence of foraging badger was identified during the Extended Phase 1 habitat survey, although no setts were recorded within the Site. Badgers are a common and widespread species in the UK, but are protected from persecution. An update survey will be undertaken if commencement of works exceeds a 12-month period from the Extended Phase 1 habitat survey to confirm the status of badger within the Site but will not be discussed further within this LEMP as they are not a species of conservation

value. An update badger survey will be required if works has not commenced by 21st April 2018.

Bats

2.4.5 The Site is considered to support limited foraging habitat for bats, with most suitable habitat being confined to peripheral habitats. Bats use linear habitat features such as hedgerows and woodland edges to commute to foraging areas, and connectivity across certain areas of the Site is currently low (e.g. between plantation woodland and Waterbody 2).

2.4.6 There is no suitable roosting habitat for bats within the development area. The plantation woodland does not contain trees with features suitable to support roosting bats.

Hedgehog

2.4.7 Suitable foraging and hibernation habitat is present within the Site to support hedgehog, in the form of grassland, tall ruderal vegetation, scrub, hedgerow bases and plantation woodland.

Reptiles

2.4.8 Hedgerow bases, grassland habitats, tall ruderal vegetation, scrub and ponds present with the Site have the potential to provide suitable breeding, foraging, basking and hibernation habitats for common reptile species. The extent of habitats within the Site that are to be developed are limited in quality and extent to support notable reptile populations.

3 ENHANCEMENT OPPORTUNITIES

3.1.1 To meet the objectives of the LEMP, priority hedgerow habitats are to be retained and enhanced as detailed in the Landscape Masterplan (Figure L16 Rev B; Appendix 1). The inclusion of nest/roost boxes will provide new opportunities for roosting bat and nesting birds within the Site.

3.2 Hedgerows

3.2.1 The defunct hedgerow along the western boundary of the Site will be gapped up to increase the structure of the hedgerow to benefit foraging and hibernating reptiles and amphibians, foraging bats, foraging and nesting birds as well as other invertebrate and mammal species.

3.2.2 The hedgerow will be enhanced to benefit wildlife through the following specifications:

- Hawthorn *Crataegus monogyna* will be used in gaps present along the hedgerow;
- Bare-rooted stock will be planted with a supporting cane during autumn;
- Rabbit protection, in the form of spiral guards, will be installed around planted stock;
- Beating up of any plant failures will be carried out in the next suitable planting season; and
- Hedgerows will be sympathetically managed to enhance their value to wildlife, detailed in Section 4.6.

3.3 Foraging and Roosting Bats

3.3.1 Woodland creation in the eastern area of the Site and hedgerow planting in the northern area of the Site and as detailed in the Landscape Masterplan (Figure L16 Rev B) will increase connectivity and linear features for commuting and foraging bats. Woodland planting adjacent to ponds will also improve connectivity from nearby woodland blocks and encourage foraging around the ponds. The creation of species-rich wildflower grassland will also improve foraging opportunities for bats, by increasing the provision of invertebrate forage.

3.3.2 Roosting opportunities for bat species will be enhanced through the provision of four bat boxes, including 2No. *2F Schwegler* and 2No. *Kent* bat boxes.

3.3.3 The bat boxes will be installed within the existing hedgerow along the north-western boundary in accordance with the following specifications:

- 2No. of bat boxes will be installed on 2No. of established mature trees (with a stem at least 20cm in diameter)
- Bat boxes will be installed at a height of 3-4m from the ground.
- Boxes will be installed in an orientation that is sheltered from prevailing wind and receives sun at least part of the day (i.e. south or south west).
- Bat boxes should be repaired or replaced as necessary but should not require any other maintenance unless broken.

3.4 Nesting birds

3.4.1 The creation of woodland blocks, a species-rich hedgerow, species-rich grassland and two ponds will enhance foraging and nesting opportunities for a variety of bird species within the Site.

3.4.2 To increase nesting opportunities for birds within the Site, a total of eight nest boxes suitable for several species of declining farmland birds, notably sparrows, will be installed in areas of semi-natural habitat within the Site:

- 6No. 32mm traditional wooden nest boxes; 3No. of boxes to be installed at varying heights (2-4m) and varying orientations (north, east, south-east) to benefit sparrows, which are a colony based species. The boxes will be installed to the west of the Site on mature trees with sufficient surrounding vegetation and clear flight paths;
- 2No. 28mm traditional wooden nest box will be installed on suitable mature trees to the south-west of the Site, at least 2m from the ground, facing away from prevailing wind, rain and direct sunlight (i.e. north to east/south-east). These boxes will be sited where there is sufficient surrounding vegetation for cover from predators, but with a clear flight path leading to the entrance.
- All bird boxes will be those with metal plates over entrance holes to prevent predation by squirrels.
- Bird boxes should be repaired or replaced as necessary but should not require any other maintenance unless broken.

4 HABITAT CREATION

4.1.1 To meet the objectives of the LEMP, the following habitats are to be created, as detailed in the Landscape Masterplan (Figure L16 Rev B).

4.2 Wildflower Meadow

4.2.1 A wildflower meadow seed mix (Emorsgate Seeds©: EM3 - *Special General Purpose Meadow Mix*) will be sown on regraded land in the south west of the Site, near woodland block 5. Sowing will take place in spring or autumn. The seed mix composition is detailed in Table 1, and has been chosen as it provides a diverse sward that will benefit bees and other pollinators, butterflies, birds, reptiles, small mammals and amphibians.

4.2.2 The location of this proposed species rich meadow is shown in Landscape Masterplan (Figure L16 Rev B).

4.2.3 The ground will be prepared following manufacturer specifications. The mix will be sown at a rate of 4g/m^2. A sensitive management regime will ensure successful colonisation and quality of the grassland, detailed in Section 5.2.

Table 1: Species composition for general purpose meadow mixture

Latin Name	Common Name	%
Wildflowers		
Achillea millefolium	Yarrow	0.5
Betonica officinalis	Betony	1
Centaurea nigra	Common knapweed	2
Centaurea scabiosa	Greater knapweed	1.3
Daucus carota	Wild carrot	1
Filipendula ulmaria	Meadowsweet	0.6
Galium album	Hedge bedstraw	0.6
Galium verum	Lady's bedstraw	2
Knautia arvensis	Field scabious	0.8
Leontodon hispidus	Rough hawkbit	0.3
Leucanthemum vulgare	Oxeye daisy	0.5
Lotus corniculatus	Birdsfoot trefoil	0.5
Malva moschata	Musk mallow	0.5
Plantago media	Hoary plantain	0.3
Poterium sanguisorba	Salad burnet	1.5
Primula veris	Cowslip	1
Prunella vulgaris	Selfheal	1
Ranunculis acris	Meadow buttercup	1.5

Table 1: Species composition for general purpose meadow mixture		
Latin Name	**Common Name**	**%**
Rhinanthus minor	Yellow rattle	1
Rumex acetosa	Common sorrel	0.6
Silene dioica	Red campion	1.2
Silene flos-cuculi	Ragged robin	0.2
Trifolium pratense	Red clover	0.1
	Total	**20**
Grasses		
Alopecurus pratensis	Common bent	8
Cynosurus cristatus	Crested dog's tail	40
Dactylis glomerata	Slender-creeping red-fescue	28
Phleum bertolonii	Smaller cat's-tail	4
	Total	**80**

4.3 Broad-leaved plantation woodland

4.3.1 Extensive areas of native woodland will be planted on bunds around the Northern and Southern car parks, the Compact Products Stock Yard, and the Earthmovers Stock Yard. Small woodland blocks will also be planted across the eastern area of the Site, that will act as 'stepping stone' habitats to improve connectivity in this area.

4.3.2 In order to create connectivity between ponds and other semi-natural habitats, small woodland blocks will be planted around the newly-created South-Western Pond. This planting will increase connectivity between Waterbody 2 and plantation woodland to the south.

4.3.3 Woodland planting will be undertaken as follows:

- Woodland planting will be at 2m spacing using bare root transplants, notch planted (or pot grown and pit planted as appropriate to the species).
- Specimens will be arranged in a random planting scheme, but in same species groups of 3 to 9 plants.
- Planting will take place during the dormant season (November-February), but not during prolonged cold spells where frost might penetrate to the roots. Established horticultural practices will be followed.
- All trees and shrubs will be protected using staked tree and shrub shelters.

4.3.4 Two mixes of native broadleaved trees and shrubs will be used: 'Mix A' and 'Mix B', detailed in Table 2. The mixes of native shrub species appropriate for woodland margins and understorey that will be used is detailed in Table 3.

Table 2: Woodland Planting

Scientific Name	Common Name	Size	Mix A	Mix B
Quercus robur	Oak	b/r t'plant; 40-60cm height	-	15%
Populus tremula	Aspen	b/r t'plant; 40-60cm height	15%	15%
Betula pendula	Silver Birch	b/r t'plant; 60-90cm height	15%	10%
Tilia cordata	Small-leaved lime	b/r t'plant; 40-60cm height	10%	10%
Salix caprea	Goat willow	b/r t'plant; 60-90cm height	20%	5%
Salix fragilis	Crack willow	b/r t'plant; 60-90cm height	15%	-
Alnus glutinosa	Alder	b/r t'plant; 60-90cm height	15%	-
Sorbus aucuparia	Rowan	b/r t'plant; 40-60cm height	-	10%
Acer campestre	Field maple	b/r/ t'plant; 40-60cm height	-	5%

Table 3: Shrub Planting

Scientific Name	Common Name	Size	Mix A	Mix B
Ilex aquifolium	Holly	Pot grown; 60-90cm height	-	5%
Crataegus monogyna	Hawthorn	b/r t'plant; 40-60cm height	-	5%
Corylus avellana	Hazel	b/r t'plant; 60-90cm height	10%	10%
Viburnum opulus	Guelder rose	b/r t'plant; 60-90cm height	-	5%
Cornus sanguinea	Dogwood	b/r t'plant; 40-60cm height	-	5%

4.4 Ponds

4.4.1 Two balancing ponds will be created within the Site as part of the SuDS strategy; the South-Western Pond will be created to the south of Waterbody 2 in an area of poor semi-improved grassland, and the North-Eastern Pond will be created in an area of poor semi-improved grassland between the Northern Car Park and the Southern Car Park.

4.4.2 Specifications for pond creation are as follows:

- Ponds will be dug with a ratio of 1:3 sloping banks on lower gradients, and 1:4 on upper gradients;
- Bankside soils surrounding the ponds will be sown with Emorsgate Seeds©: EM3 - *Special General Purpose Meadow Mix* detailed in 4.2;

- Trees and shrubs will be planted on the banksides that are typical of wetland species including willows *Salix* spp and alder *Alnus glutinosa*. Planting specifications are detailed within 4.3; and
- Marginal and aquatic vegetation will be allowed to colonise and establish naturally.

4.4.3 Reedbeds will be created at the inlet of the South-Western Pond and the North-Western Pond, as part of the SuDS Strategy (GHW Consulting Engineers Ltd, 2017):

- Common reed *Phragmites australis* 40-90cm in height grown in rootrainers, will be planted at a density of 4 plants per m^2, in water a maximum depth of 40cm.
- Planting will take place once pond creation is complete, and will avoid periods of frost.

4.5 Hedgerows

4.5.1 A species-rich hedgerow, approximately 178m in length, is to be planted along the northern and north western Site boundary; providing connectivity between existing hedgerows.

4.5.2 Specifications for hedgerow planting are as follows:

- Specimens will be planted during the dormant season (November-February), but not during prolonged cold spells where frost might penetrate to the roots;
- Specimens will be planted in two staggered rows at a density of at least 5m with approximately 300mm between plants and 450mm between rows;
- Rabbit protection, in the form of spiral guards, will be installed around transplants;
- Four individual standard Pedunculate oak *Quercus robur* will be planted at random individuals within proposed hedgerow planting. The plants will be bare root transplants at a height of 40-60cm.

4.5.3 New hedgerows are to be planted with a mix of species as detailed in Table 4, below.

Table 4: Hedgerow Planting

Qty	Species	Common Name	% mix	Type	Height
534	*Crataegus monogyna*	Hawthorn	60	b/r transplant	40-60cm
134	*Acer campestre*	Field maple	15	b/r transplant	40-60cm
89	*Corylus avellana*	Hazel	10	b/r transplant	40-60cm
45	*Ilex aquifolium*	Holly	5	3L pot grown	60-90cm
89	*Viburnum opulus*	Guelder rose	10	b/r transplant	40-60cm

5 MONITORING AND MANAGEMENT

5.1 Neutral and Calcareous Grassland

5.1.1 Long term management would aim to encourage a diverse, species rich sward. Details for the management is as follows:

Establishment and Aftercare (Years 1-2)

5.1.2 The species-rich wildflower meadow created to the south-west of the Site includes species that are perennial and will be slow to germinate and grow, and will not usually flower in the first growing season. Regular cutting to maintain an average sward height of 4-6cm will be undertaken, as required, in the first/second autumn/spring to promote grass growth and control weeds. Arisings will be removed from the area within 48hours to minimise nutrient enrichment.

5.1.3 Areas of non-establishment to be assessed after first growing season and re-sown as required.

Management (Year 2 onwards)

5.1.4 To achieve diverse grassland swards across the Site, grassland areas will be allowed to flower and set seed prior to an autumn cut. The sward will be strimmed to a height of 5-8cm, with a 3-4m wide uncut margin that will be retained along the sides of the grasslands, on rotation each year, to provide a refuge for small mammals, reptiles and invertebrates. Arisings will be removed from Site within 48hours to minimise nutrient enrichment. The hay cut will, therefore, only be undertaken when a period of dry weather is forecast.

5.2 Marshy grassland

5.2.1 Marshy grassland requires minimal maintenance. Marshy grassland may need cutting annually on a rotational basis, between November and February, to control bramble scrub development. Cutting up to 25% on a rotational basis allows areas to be left uncut as a refuge for wildlife. Any unwanted perennial weeds (such as docks or thistles) may require control by hand pulling or spot treatment with an approved herbicide.

5.3 Broad-leaved plantation woodland

Establishment and Aftercare (Years 1-5)

5.3.1 The specification for establishment of broad-leaved woodland areas shall be as follows:

- Specimens will be firmed and watered as necessary;
- Once planting is established, generally from Year 3 onwards, stakes and shelters may be removed. All stakes and shelters will be removed by the end of Year 5;
- Planting stations will be maintained free of weeds at a diameter of 1 metre by the application of glyphosate-based herbicide, together with a winter herbicide if required;
- Weeds growing within the shelters will be cleared by hand, or lifted and sprayed using glyphosate herbicide;
- These maintenance operations are likely to be undertaken at the following frequency:
    - Years 1 and 2: April, July and September plus possible winter herbicide;
    - Years 3, 4 and 5: April and August plus possible winter herbicide.
- If excessive growth occurs between planting it may be necessary to strim between specimens (up to 75% of herbs); and
- At each maintenance visit planted areas will be checked for pests and diseases and any symptoms reported to the ground maintenance team. Treatment will be in accordance with best horticultural/forestry practice.

Once new woodland is established, it will be managed in line with existing woodland, detailed in the management section below.

Management (year 5 onwards)

5.3.2 Long term management of woodland habitats within the Site shall be through a process of thinning in year 5 to remove any diseased specimens or poor growth. No more than one-third of trees and shrubs shall be removed in any one season to ensure that sufficient habitat is retained whilst allowing the remaining trees enough canopy space to develop healthy growth and crowns. Plantation woodland will be managed to ensure there is a diverse structure to ground, understory and canopy layers as follows:

- Selective thinning and targeting coppicing between November and February at 5 year intervals;
- Any felled timber will be used to create habitat piles. These refugia are to be created near to ponds and within woodland, where they will be particularly

valuable to amphibians, invertebrates and small mammals. Fallen deadwood shall be retained within the woodland areas to provide habitat for invertebrates and woodland fungi. This will require an appropriate balance to be achieved between safety, visual appearance and wildlife value, with care taken not to over 'tidy' woodland areas.

5.4 Scrub and tall ruderal vegetation

5.4.1 In order to control excessive growth, scrub and tall ruderal vegetation will be cut on an annual rotation between November and February, with no more than half the area being cut in any one year to allow undisturbed refuge for wildlife.

5.5 Ponds

5.5.1 The following management tasks will be carried out on newly-created ponds and existing ponds on an annual basis:

- Native aquatic plants that colonise the pond will be left to grow;
- Remove 25% of bank vegetation from the water's edge to a minimum of 1m above water level, to prevent encroachment and overshading. Arisings will be added to brash piles created from hedgerow and woodland management;
- Any nuisance plants that may grow amongst marginal and bankside vegetation will be removed monthly (or as required);
- A maximum of 25% of submerged and emergent aquatic plants (minimum 10cm above the pond base) will be hand cut;
- All dead growth will be cleared before the start of the growing season;
- Cleared vegetation will be left on the bankside of the ponds for 24hours, to allow wildlife to disperse back into the pond, before being disposed of off-site;
- The above tasks are to be carried out in winter to avoid the amphibian breeding season, and bird nesting season; and
- Every 5 years, sediment and planting will be removed from one quadrant of the body of ponds without sediment forebays.

5.5.2 The above management tasks, and other pond maintenance tasks, are detailed in the SuDS Strategy (GHW Consulting Engineers Ltd, 2017).

5.5.3 The condition of all ponds will be monitored monthly for water quality, the presence of litter and debris, and invasive plant species. Remedial action will be undertaken

where necessary. If invasive species are identified, then agreement with the EA will be obtained prior to the use of targeted herbicide treatment.

5.6 Hedgerows

Establishment and Aftercare of Planted Hedgerows

5.6.1 The specification for establishment and aftercare of newly planted species-rich hedgerows will be as follows:

- Specimens will be firmed and guards as necessary;
- Once planting is established, generally from Year 3 onwards, stakes and shelters may be removed. All stakes and shelters will be removed by the end of Year 5;
- Hedgerows will be maintained free of weeds along the length of the double staggered row and for an overall width of 1metre;
- Beating up of any plant failures will be carried out in the next suitable planting season; and
- Weed treatment to finish in year 4 to allow ground flora to establish.

5.6.2 From Year 5, the management of planted hedgerows will be concurrently with existing hedgerows, detailed below.

Management

5.6.3 Long term management of hedgerow habitats within the Site shall be to improve their structure and quality as follows:

- Any planting / works undertaken near hedgerows and trees which are being retained will be undertaken in accordance with British Standard BS5837:2012 "*Trees in Relation to design, demolition and construction – Recommendations";*
- Existing and new planted hedgerows will be allowed to grow to a minimum of 2m in height;
- Hedgerows within the Site will be trimmed on a two yearly rotation basis, incrementally raising the cutting height each year. A flail for sympathetic cutting will be used;
- Branches and saplings will be selectively thinned to allow penetration of light to the understorey;
- Management will be carried out in winter to avoid nesting birds; and

- Arisings will be used to create brash piles in discrete areas at the base of the hedgerow that will provide natural refugia for invertebrates, amphibians and small mammals.

5.7 Running water

5.7.1 To maintain the value of the stream along the west of the Site for biodiversity, the following management will be undertaken:

- Sections (up to 25% of the stream's length) will be cleared of emergent and marginal vegetation in late summer/autumn on an annual rotational basis, in order to leave undisturbed sections for wildlife;
- Removed vegetation will be left on the bankside for 24 hours to allow wildlife to re-enter the waterway, before being removed off-Site to minimise nutrient enrichment; and
- Management will occur from one bank only (alternative banks to be managed on rotation), in an upstream direction to allow wildlife to recolonise disturbed areas more easily.

6 PROTECTION OF ECOLOGICAL RECEPTORS

6.1.1 In order to meet the objectives of the LEMP, protection measures are detailed below for the following ecological receptors and semi-natural habitats; foraging bats, nesting birds, Cecilly Brook Local Nature Reserve (LNR), ponds and running water.

6.1.2 Habitat management activities will be carried out at appropriate times of the year in order to reduce impacts on other protected species (e.g. amphibians, hedgehog, reptiles) that are not covered below. Other methods of avoiding harm to wildlife include the use of rotational management and undisturbed areas of habitat for continual refuge provision. Appropriate timing and avoidance measures are given for each habitat in Section 5, above, and in Table 5, below.

6.1.3 Protection measures for all species that may be encountered within the Site (including bats and nesting birds), and Cecilly Brook LNR, during the construction phase are detailed within the CEMP (Wardell Armstrong, 2018).

6.2 Nesting birds (general)

6.2.1 All pruning / removal works to existing vegetation will avoid the bird breeding season (March to August inclusive). If this is not possible, an Ecologist will check that the vegetation to be cleared is free of nesting birds, immediately prior to removal. If an occupied nest or a bird constructing a nest is found, which would be damaged or disturbed by the works, no works will commence until the young have fledged.

6.3 Sensitive lighting scheme for bats and nesting birds

6.3.1 A sensitive lighting scheme will be implemented across the Site, in order to reduce disturbance to habitats within and adjacent to the Site that bats may use for foraging, commuting and roosting, and birds may use for nesting. The lighting scheme for the Car Parks and Lorry Park (Couchperrywilkes, 2017) includes:

- Low energy LED lights with tightly-focused down lighting will be used, to ensure that no upward or excess light spill is produced;
- The lights will be carefully positioned in order to reduce light transfer into surrounding areas;
- Lights will be switched off when out of hours;
- Within occupied hours' sensors will dim down the light levels by 50% if no occupancy is detected within the area; and

- Lights will be controlled during operational hours based on the occupancy of an area.
- There will be no artificial lighting in the west of the Site, hence no semi-natural habitats in the west of the Site (ie. ponds, plantation woodland, hedgerows and grassland habitats) will suffer any adverse effects from artificial lighting.

6.3.2 The lighting scheme adheres to advice given by Bat Conservation Trust (2014) and Institute of Lighting Professionals (2011).

6.4 Cecilly Brook Local Nature Reserve

6.4.1 To prevent adverse effects on the LNR's nature conservation interest, surface run-off from the developed areas will go through multiple treatments before reaching the ditch and adjoining brook that provide ecological connectivity with the LNR.

6.4.2 Lateral stone filter drains within the car parks will provide two required treatments, and carry water to the North-Eastern Pond, where the created reed bed will provide a further treatment. Water will then be discharged at an attenuated rate into the ditch (GHW Consulting Engineers Ltd, 2017).

6.4.3 Protection measures to prevent accidental pollution or physical damage during construction to the ditch that is ecologically connected to the LNR are detailed in the CEMP (Wardell Armstrong LLP, 2018).

6.5 Ponds and running water

6.5.1 To prevent adverse effects from pollution on the waterbodies that are local BAP priority habitats within the Site, surface run-off from the developed areas will be treated before entering these semi-natural habitats.

6.5.2 Water treatment for the east of the Site is detailed in Section 6.4, above. In the west of the Site, surface run-off will be collected by a network of beany channels in the storage yards and treated in a full retention interceptor before entering a reed bed at the inlet of the South-Western Pond. Water will then be discharged at an attenuated rate into the ditch to the south. Therefore, surface run-off will be sufficiently treated before entering local BAP priority habitats.

6.5.3 The treatment methods are summarised in Section 6.4, above, and provided in detail in the SuDS Strategy (GHW Consulting Engineers Ltd, 2017). Protection measures for ponds and running water during construction are detailed in the CEMP (Wardell Armstrong LLP, 2018).

7 SITE MONITORING, MAINTENANCE AND IMPLEMENTATION

7.1 Key Personnel and Responsibilities

7.1.1 The Client is responsible for the implementation of this LEMP.

7.2 Monitoring

7.2.1 This LEMP details the aims and objectives that habitat management within the Site will be aiming to achieve during the first 5-years from commencement of the management plan. The effectiveness of the management to achieve these aims will be monitored so they can be reviewed and revised. Annual meetings, to include a Site visit, will be held and annual reports will be provided detailing the previous year's aftercare measures, including comments on the successes and failures of management, and plans for future management.

7.2.2 The management plan will be reviewed in the 5th year of the management plan for the subsequent 5-year period. This process will be repeated throughout the next 20-year period.

7.3 Maintenance

7.3.1 Routine maintenance visits will be carried out on a quarterly basis, and ensure the site is maintained free of litter and rubbish, and that shelters within created woodland and gapped hedgerows are in good condition.

7.4 Work Schedule

7.4.1 Table 5 describes the actions and proposed schedule required to maintain and enhance the nature conservation value of the Site.

Table 5: Work Schedule

Task	Year 1				Year 2				Year 3				Year 4				Year 5			
	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
General																				
Remove rubbish and litter from site		◆				◆					◆				◆				◆	
Poor semi-improved grassland and semi-improved calcareous grassland																				
Rotational cutting (after flowering season is complete) (to a height of 5-8cm), retaining a 3-4m wide margin.				◆				◆				◆				◆				◆
Created species-rich grassland																				
Sowing of seed mixture (spring OR autumn)		◆		◆																
Cutting (to a height of 4-6cm), retaining a 3-4m wide margin.			◆	◆	◆	◆	◆	◆				◆				◆				◆
Re-seeding				☐		☐		☐		☐		☐		☐		☐		☐		☐
Monitoring grassland establishment			◆				◆				◆				◆				◆	
Marshy grassland																				
Rotational cutting of up to 25%					◆				◆				◆				◆			
Spot treatment/hand pulling of unwanted perennial weeds		☐				☐				☐				☐				☐		
Created broad-leaved plantation woodland																				
Planting (between November and March)				◆	◆															
Pulling of weeds within tree shelters		◆		◆		◆		◆			◆				◆				◆	
Herbicide treatment of weeds within tree shelters					☐				☐				☐				☐			
Targeted thinning and coppicing (no more than one third of trees to be removed)																				◆
Assess tree shelters			◆				◆				◆				◆				◆	
Remove shelters and stakes											☐				☐				◆	

Table 5: Work Schedule

Task	Year 1				Year 2				Year 3				Year 4				Year 5			
	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
Watering		□				□					□				□				□	
Check for pests and disease		◆				◆					◆				◆				◆	
Existing broad-leaved plantation woodland																				
Targeted thinning and coppicing																				◆
Creation of habitat piles				□				□				□				□				□
Scrub and tall ruderal vegetation																				
Rotational cutting (up to 50%)					◆				◆				◆				◆			
Ponds																				
Cut submerged and emergent aquatic plant (maximum of 25% of pond surface)					◆				◆				◆				◆			
Remove all dead growth					◆				◆				◆				◆			
Remove 25% of bank vegetation to a minimum height of 1m above water level, to prevent over shading.					◆				◆				◆				◆			
Inspect marginal and bankside vegetation and remove nuisance plants	◆	◆	◆	◆	◆	□	□	□	□	□	□	□								
Inspect water body for signs of poor water quality		◆	◆	◆		◆	◆	◆		◆	◆	◆		◆	◆	◆		◆	◆	◆
Clearance of litter and debris	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Sediment and planting to be removed from one quadrant of the waterbody																				◆
Hedgerows																				
Gapping up of existing hedgerows				◆	◆															
Assess shelters				□				□				□				□				□

Table 5: Work Schedule

Task	Year 1				Year 2				Year 3				Year 4				Year 5			
	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
Rotational trimming								◆								◆				
Remove shelters											☐	☐			☐	☐				◆
Watering		☐				☐				☐				☐				☐		
Beating up of plant failures				☐				☐				☐				☐				☐
Running water																				
Rotational clearance of emergent and marginal vegetation – works to be carried out from one bank only, in an upstream direction.					☐				☐				☐				☐			
Bat and bird boxes																				
Installation				◆	◆															
Check for damage					☐				☐				☐				☐			
Review of LEMP																				
Review management prescriptions and amend management, if required.																				◆

KEY

◆ Required

☐ Monitor and undertake if necessary

8 REFERENCES

Bat Conservation Trust (2014) *Artificial lighting and wildlife Interim Guidance: Recommendations to help minimise the impact artificial lighting.* [Available online at] http://www.bats.org.uk/pages/bats_and_lighting.html

British Standard (2013) BS 42020:2013-'*Biodiversity – Code of practice for planning and development*'.

British Trust for Ornithology (1993) *Nestboxes* [Accessed online] https://www.bto.org/sites/default/files/u15/downloads/publications/guides/nestbox.pdf

Couchperrywilkes (2017) *JCB Car Park External Lighting Proposals.*

GHW Consulting Engineers Ltd (2017) *SuDS Strategy, Maintenance Plan & Calculations*, JCB Harewood Estate External Works Alterations.

Institute of Lighting Professionals (2011) *Guidance Notes for the Reduction of Obtrusive Light*, GNO1:2011.

Wardell Armstrong LLP (2017a) J C Bamford Excavators Ltd, Harewood Estate, Cheadle, *Great Crested Newt Survey Report*.

Wardell Armstrong LLP (2017b) J C Bamford Excavators Ltd, Harewood Estate, Cheadle, *Preliminary Ecological Appraisal*.

Wardell Armstrong (2018) J C Bamford Excavators Ltd, Harewood Estate, Cheadle, *Construction and Environmental Management Plan*.

Appendix 1

Landscape Masterplan (Figure L16 Rev B)

				Compartment reference	BLOCK WB1	BLOCK WB2	BLOCK WB3	BLOCK WB4	BLOCK WB5	BLOCK WB6	BLOCK WB7a-c	BLOCK WB8a-d	BLOCK WB9a-d	TOTAL
				Compartment area (sqm)	4000	570	2100	620	4300	650	180	240	144	12804
				Total Plants (2m grid):	1000	143	525	155	1075	163	45	60	36	3201
Botanical Name	**Common Name**	**Size**	**Guard**	**Type**	**% Mix A**	**% Mix B**								
Quercus robur	Pedunculate oak (T)	40-60	tree shelter	Transplant	0	15	150	21	79	23	161	24	0	0	5	464
Populus tremula	Aspen (T)	40-60	tree shelter	Transplant	15	15	150	21	79	23	161	24	7	9	5	480
Betula pendula	Silver birch (T)	40-60	tree shelter	Transplant	15	10	100	14	53	16	108	16	7	9	4	325
Tilia cordata	Small-leaved lime (T)	40-60	tree shelter	Transplant	10	10	100	14	53	16	108	16	5	6	4	320
Ilex aquifolium	Holly(S)	60-90	netguard	Pot grown	0	5	50	7	26	8	54	8	0	0	2	155
Salix caprea	Goat Willow	60-90	tree shelter	Transplant	20	5	50	7	26	8	54	8	9	12	2	176
Salix fragilis	Crack Willow	60-90	tree shelter	Transplant	15								7	9		
Alnus glutinosa	Alder	60-90	tree shelter	Transplant	15								7	9		
Crataegus monogyna	Hawthorn (S)	40-60	shrubshelter	Transplant	0	5	50	7	26	8	54	8	0	0	2	155
Sorbus aucuparia	Rowan (T)	40-60	tree shelter	Transplant	0	10	100	14	53	16	108	16	0	0	4	310
Corylus avellana	Hazel (S)	60-90	tree shelter	Transplant	10	10	100	14	53	16	108	16	5	6	4	320
Viburum opulus	Guelder Roase (S)	60-90	shrubshelter	Transplant	0	5	50	7	26	8	54	8	0	0	2	155
Cornus sanguinea	Dogwood (S)	60-90	shrubshelter	Transplant	0	5	50	7	26	8	54	8	0	0	2	155
Acer campestre	Field Maple (T)	40-60	shrubshelter	Transplant	0	5	50	7	26	8	54	8	0	0	2	155
					100	100	1000	143	525	155	1075	163	45	60	36	3170

Botanical Name	**Common Name**	**Size (cm)**	**Type**	**Shelter**	**% Mix**	**Plants per 8m length**	**Quantity**	**Total**
						Compartment Reference	**1**	
Hedge Mix:						Hedgerow length (m):	178	**178**
						Plants per metre:	5.0	
Crataegus monogyna	Hawthorn	40-60	Transplant	-	60	24	534	**534**
Acer campestre	Field Maple	40-60	Transplant	-	15	6	134	**134**
Corylus avellana	Hazel	40-60	Transplant	-	10	4	89	**89**
Ilex aquifolium	Holly	60-90	3L pot grown	-	5	2	45	**45**
Viburnum opulus	Gelder Rose	40-60	Transplant	-	10	4	89	**89**
Individual Trees:					**100%**	**40**		
Quercus robur	Pedunculate oak	40-60	Transplant	1.2m Treeshelter	-	-	4	**4**
Total							**894**	**894**

Northern Car Park Screen Bund
c. 4.5metres screening from car park level
1:3 to 1:2.5 outer gradient and 1:2 inner gradient

Northern Car Park Screen Bund
c. 4metres screening from car park level
1:2 to 1:1.5 outer gradient and 1:1.5 inner gradient

Northern Car Park Screen Bund
c. 2.5metres screening from car park level
1:3 to 1:2 outer gradient and 1:1.5 inner gradient

North-Eastern Pond
1:3 on lower gradients and 1:4 on upper gradients
Permanent water depth of 2metres W.L. @ 177mAOD

Existing hedgerow gaps infilled with additional hawthorn planting, (numbers not included in planting matrix)

Southern Car Park Screen Bund
c. 3.5-4metres screening from car park level
1:2 outer gradient and 1:1.5 inner gradient

Southern Car Park Screen Bund forming steep outer gradient steeper than 1:1.5 to be stabilised with Geocell (350x150) or similar

Southern Car Park Screen Bund
c. 2.5metres screening from car park level
1:2 to 1:1.5 outer gradient and 1:1.5 inner gradient

JCB Earthmovers Stock Yard with 1:2 inner cut slope

South-Western Pond
1:3 on lower gradients and 1:4 on upper gradients with permanent water depth of 2metres W.L. @ 175mAOD

South-Western Bund lower slopes broadly 1:3 to 1:15 and up to 6metres in overall height in central area of the Bund

JCB Compact Products Stock Yard with 1:2 inner cut slope

WB1 WB2 WB3 WB4 WB5 WB6 WB7a WB7b WB7c WB8a WB8b WB8c WB8d WB9a WB9b WB9c WB9d

Earthmovers

Compact Products

Harewood Grange Farm

Tank

Tanks

Ponds

Pond

Path (um)

LEEK ROAD

A522

176.3m

174.9m

344800N 344700N 344600N 344500N 344400N 344300N 344200N 344100N 344000N 343900N

399600E 399700E 399800E 399900E 400000E 400100E 400200E 400300E

0m 10m 25m 50m 100m

Key:

- Planning Application boundary (the Site)
- Site Survey information illustrated for site reference
- Principal proposed layout from Architect drawing 17-126-sk-16-05-17-01D
- Boundary of principal landform alteration
- Area proposed for woodland planting with Woodland Block (WB) number
- Proposed landform contours
- Bund formation requiring engineered reinforcement geotextile or similar
- Area proposed for Emorsgate EM3 'Special General Purpose Meadow Mix' sown at 4gms/m
- Proposed native species hedgerow

Revisions:
Revision A, 22 August 2017: Addition of WB7a-c, WB8a-d, WB9a-d
Revision B 30 August: Addition of hedgerow and grassland specification, with minor modification to tree species

NOTES:
Appendix 4: Planting Specification and Management Details provides further information regarding planting numbers, planting methods and management.

Client: J.C. Bamford Excavators Ltd.

Project: **JCB Earthmovers and Compact Products Ltd.**
Landscape and Visual Impact Assessment

Title: Landscape Masterplan

CAD Ref:	Version:	Drawn by:	Plot size: A1	Date:
JC1103-D6v1 Rev B	1	RB	Scale: 1:1500	June 2017

Based upon the Ordnance Survey maps with the permission of the controller of Her Majesty's Stationery Office, © Crown Copyright reserved. Licence number AR100019096.

bright & associates
landscape and environmental consultants
Pear Tree House Dovaston Oswestry Shropshire SY10 8DP
01691 682 773 www.bright-associates.co.uk
Registered Practice Landscape Institute

Drawing: **Figure L16 Rev B**

wardell-armstrong.com

STOKE-ON-TRENT
Sir Henry Doulton House
Forge Lane
Etruria
Stoke-on-Trent
ST1 5BD
Tel: +44 (0)178 227 6700

BIRMINGHAM
Two Devon Way
Longbridge Technology Park
Longbridge
Birmingham
B31 2TS
Tel: +44 (0)121 580 0909

CARDIFF
22 Windsor Place
Cardiff
CF10 3BY
Tel: +44 (0)292 072 9191

CUMBRIA
Marconi Road
Burgh Road Industrial Estate
Carlisle
Cumbria
CA2 7NA
Tel: +44 (0)122 856 4820

EDINBURGH
Great Michael House
14 Links Place
Edinburgh
EH6 7EZ
Tel: +44 (0)131 555 3311

GLASGOW
2 West Regent Street
Glasgow
G2 1RW
Tel: +44 (0)141 433 7210

LONDON
46 Chancery Lane
London
WC2A 1JE
Tel: +44 (0)207 242 3243

MANCHESTER (City Centre)
76 King Street
Manchester
M2 4NH
Tel: +44 (0)161 817 5038

MANCHESTER (Greater)
2 The Avenue
Leigh
Greater Manchester
WN7 1ES
Tel: +44 (0)194 226 0101

NEWCASTLE UPON TYNE
City Quadrant
11 Waterloo Square
Newcastle Upon Tyne
NE1 4DP
Tel: +44 (0)191 232 0943

SHEFFIELD
Unit 5
Newton Business Centre
Newton Chambers Road
Thorncliffe Park
Chapeltown
Sheffield
S35 2PH
Tel: +44 (0)114 245 6244

TRURO
Baldhu House
Wheal Jane Earth Science Park
Baldhu
Truro
TR3 6EH
Tel: +44 (0)187 256 0738

International offices:
ALMATY
29/6 Satpaev Avenue
Regency Hotel Office Tower
Almaty Kazakhstan
050040
Tel: +7(727) 334 1310

MOSCOW
21/5 Kuznetskiy Most St.
Moscow
Russia
Tel: +7(495) 626 07 67

your earth our world

wardell armstrong