

## FRAMEWORK AGREEMENT SCHEDULE 4

### ORDER FORM/ WORK PACKAGE ORDER

#### FROM

<b>Authority</b>	Secretary of State for Environment, Food and Rural Affairs
<b>Address</b>	Defra Group Commercial 3 <sup>rd</sup> Floor, Mallard House 1-2 Peasholme Green York YO1 7PX
<b>Contact Ref:</b>	Phone: [REDACTED] Email: [REDACTED]
<b>Order Number</b>	Ref: ecm 59677
<b>Order Date</b>	19 November 2020

#### TO

<b>Contractor</b>	Fera Science Ltd
<b>For attention of:</b>	Name: [REDACTED] Phone: [REDACTED] E-mail [REDACTED]
<b>Address</b>	Sand Hutton York North Yorkshire YO41 1LZ

#### 1. SERVICES REQUIREMENTS

##### (1.1) Services [and deliverables] required:

Landscape scale nature recovery is a key priority in the government's 25 Year Environment Plan with a range of delivery mechanisms such as the Nature Recovery Network and support for Environmental Land Management. Improving ecological networks is based on the principles described in the Making Space for Nature Report (Lawton et al., 2010) – bigger, better, more and joined-up. Agri-environment schemes (AES) are critical for delivering across these four principles, providing opportunities for habitat creation, maintenance and restoration, as well as softening the agricultural matrix to reduce barriers to species moving through the landscape.

The role of AES in ecological connectivity has been explored in previous projects, such as the Initial Evaluation of Countryside Stewardship Implementation (LM0464); Synthesising review of Environmental Stewardship (BD5010) and Facilitation Fund Phase 2 (LM0479); and most recently LM04100 (Draft Final Report at Annex 1) which assessed the extent to which AES options are located to improve ecological connectivity. In the latter project, structural connectivity of a range of priority habitats was analysed in relation to the National Habitat Networks (Edwards et al., 2019), with findings indicating that, in general, key AES options for connectivity were located within the appropriate network zones, though analysis was constrained by a range of data limitations. The functional connectivity of four generic focal

species groups was modelled for scenarios with and without AES options implemented at the national scale. Broadly, connectivity was found to increase with the implementation of restoration options, compared to a non-AES baseline counterfactual, however some focal species groups e.g. for wetlands, were found to be highly fragmented regardless of AES presence. The analysis made a number of assumptions regarding habitat quality and AES implementation which require further investigation, whilst modelling at the England scale will have hidden large local impacts.

Whilst LM04100 built on existing agri-environment monitoring and evaluation findings, one principle limitation was the lack of field measurements to inform the cost of species movement through different habitats, an underpinning assumption of the species connectivity modelling. This habitat quality is linked to one of the key principles from the Making Space for Nature report; making sites better. The modelling which has been undertaken so far of AES contribution to ecological connectivity assumes that AES options are implemented fully according to prescriptions and therefore act to improve patch quality, and thus the connectivity for species across the landscape. The importance of making patches better was also highlighted in the Grassland Restoration for Ecological Networks project (LM0450) which investigated how to maximise arable reversion success for the benefit of native invertebrate biodiversity. Local site quality was found to be of fundamental importance to provide suitable conditions for colonising invertebrates as, without a minimum standard of arable reversion (e.g. floristic coverage), the resulting sites were unlikely to be able to contribute towards landscape scale connectivity for these grassland habitat types.

Within an ecological network, high quality patches are able to provide sufficient resources for species to thrive, and thus are reflected by high species richness, diversity and abundance. Furthermore, high quality patches will be of sufficient size to be functionally viable for species; a mosaic of habitats will provide the required variety in structure required for different species activities/movements; a low edge to area ratio reduces the potential of adverse edge effects, and finally buffering can reduce neighbouring adverse conditions such as pollution.

## **Project Aim & Objectives**

The aim of this project is to assess the extent to which agri-environment schemes effect quality within ecological networks.

**The research questions that this project should answer include:**

1. What is the effect of core AES options on habitat quality and therefore ecological connectivity of focal species?

Core AES options are those focused on habitat creation, maintenance and restoration and have the greatest potential to improve habitat quality and therefore connectivity of species within a landscape. The success of AES options in improving habitat quality should be assessed in the field, as well as the sensitivity of connectivity modelling to any change in quality.

2. How well do agreement holders collaborate to deliver ecological connectivity at the landscape scale?

Conservation delivery at the landscape scale is required to improve ecological connectivity, and the challenge of developing shared aims across multiple private landowners will be addressed through initiatives such as the Facilitation Fund. Modelling provides an opportunity to compare scenarios within landscapes and therefore the impact of these agreement holder collaborations on local species connectivity.

**The specific objectives of this project are to:**

1. Revise the relationships between options, habitats and mobile species in terms of functional connectivity, building on the findings of previous projects LM04100 and LM0448.
2. Identify suitable study areas and focal species and construct a land cover spatial dataset to support connectivity modelling and field survey work.
3. Develop and agree survey protocols and undertake field surveys to assess habitat quality in relation to focal species connectivity and AES option implementation.
4. Test the connectivity modelling assumptions from LM04100 to identify methodological improvements.
5. Calculate connectivity metrics for different landscape scenarios and make comparisons with field based cost layers.

Funding has been secured for 2020/21 and it is intended that, **subject to confirmation of budgets**, further funding will be forthcoming to enable this study to continue into 2021/22. The project is therefore presented in two phases; tasks 1 and 2, as well as the least cost path sensitivity analysis and comparison methods for two of the three areas of interest should be completed in year 1 (2020/21) with the remaining components of tasks 3 and 4 to be delivered by 31 May 2021 and task 5 to be completed in year 2 (2021/22).

The approach set out here is not prescriptive and alternative methods or approaches that meet the project objectives would be considered by the Project Steering Group (PSG), providing they are clearly stated, and the rationale is sound.

## **Tasks**

**Task 1 - Identify associations between AES options, habitats and mobile species, building on those relationships identified in LM04100 and LM0448.**

A spreadsheet developed for LM0448 attributed Environmental Stewardship options to core/matrix habitats and individual priority habitats and was updated to include Countryside Stewardship options during project LM04100. The spreadsheet therefore identifies which options contribute to the connectivity of which habitats and is used as an input to the connectivity analysis. This task will update the spreadsheet, amending the relationships between options and habitats as necessary, adding appropriate species groups to options, and identifying groupings of options that can be applied together to assess whether the overall impact of multiple options is greater or smaller than the options applied individually.

## Task 2 - Study area selection & data collation.

The research questions stated above should be answered for selected study areas, chosen in discussion with the project steering group. The study areas should take account of the criteria below and may include upland and lowland (e.g. arable and pastoral) examples.

- Presence of an existing landscape-scale land-owner grouping which has the aim of improving biodiversity or connectivity for wildlife e.g. Facilitation Fund groups, Farm cluster, Nature Improvement Areas. A list of facilitation fund groups, with objectives, can be provided.
- A range of historical agri-environment interventions across the study area (Environmentally Sensitive Areas; Classic Countryside Stewardship Scheme; Environmental Stewardship; Countryside Stewardship).
- Availability of existing survey data, e.g. from previous agri-environment monitoring and evaluation projects, Baseline Evaluation of Higher Tier Agreement surveys as part of CS application, citizen science data such as Breeding Bird Survey, Butterfly Monitoring Survey and BSBI.

All data used within this project must be licensed by Natural England and all data licensing must be agreed with Natural England by contacting [data.services@naturalengland.org.uk](mailto:data.services@naturalengland.org.uk) prior to data being obtained and analysis commenced. A list of potential datasets are listed below, however it is the responsibility of the contractor to arrange the appropriate licensing.

The generic focal species associated with the study areas should be identified for connectivity modelling, as well as any specific species which are of local importance, for example the study area may have a facilitation fund group aiming to improve the connectivity of specific habitats, for specific species groups (e.g. farmland birds, amphibians, bats etc.). The attributes to be identified for each focal species in the study area includes; minimum viable area and dispersal distributions. The movement cost associated with different habitats for each focal species will be investigated at a later stage of this project.

In order to undertake the required assumption-testing and connectivity modelling on the chosen study area, a spatial layer of land cover and AES options should be developed, including but not limited to the datasets listed below. This spatial layer will form the input for connectivity modelling and should be constructed in a way that updated land cost information can be added following field surveys.

Dataset name	Data Supplier	Has NE received a licence to use the source data	Licence Terms
<a href="#">National Character Areas</a>	NE	Open Licence (OGL)	Government

<a href="#">Countryside Stewardship Scheme 2016 Management Options (England)</a>	NE		OGL
<a href="#">Environmental Stewardship Scheme Options (England)</a>	NE		OGL
Agri-environment agreement documents	NE		To be arranged (TBA)
Facilitation Fund group spatial data layer (LM0479)	NE		TBA
LM04100 datasets (see Annex 1)	NE		TBA
Land parcel data (Rural Land Register)	RPA/ NE		Supply permitted to contractors
Land Cover Map (2015)	CEH/ NE		Supply under contractor licence

### Task 3 - Connectivity Modelling Assumption Testing

The structural and functional connectivity modelling in LM04100 was based on a number of assumptions, further details of the methods are provided in Annex 1. This task will test those assumptions using the study areas to model connectivity using the least cost pathway approach, to determine the impact of the assumptions made on the connectivity modelling results of LM04100. From this task, recommendations should be made as to whether the assumptions are valid, or should be changed for future modelling with least cost pathways. Each assumption is specified in italics below.

Structural connectivity:

- *Option locations within the National Habitat Network zones were assumed based on option type and zones present within parcels as the exact geolocation of options was not available.*

Due to the location of sub-parcel options not being known, the structural connectivity analysis included a range of assumptions of which zones options were located within. The inability to accurately locate options could have a significant impact on the modelled connectivity and this assumption should be tested by comparison with the actual location of options within the study areas. The results of this testing will indicate to what extent accurate option location data at the sub-parcel scale is critical for connectivity analysis, informing ELMs evidence requirements.

Focal species connectivity:

The impact of the costs chosen for species movement across different habitats should be explored. The assumptions used within the modelling, and possible ways to investigate these assumptions are detailed below. Further information from the literature may be required to support sensitivity analyses. The connectivity indices used in LM04100 included: mean, median, modal and maximum patch size (ha); total number of patches, number of patches exceeding minimum viable area (MVA) and percentage of patches exceeding MVA. The scenarios for

which species connectivity was compared in LM04100 were; (a) no AES options implemented, (b) only maintenance options (core & matrix) had been implemented, (c) only maintenance and restoration (core & matrix (non-linear)) options had been implemented and (d) all options had been implemented.

- *Where the option is implemented, it has achieved the intended effect i.e. the land cover is of high quality.*

Previous monitoring and evaluation have revealed the quality of AES option implementation varies between landowners (Staley et al., 2018) as well as between and within options (Boatman et al., 2013). Therefore, the assumption that implemented options are able to provide for focal species might not hold, hence ideally field surveys could be used to assess the extent to which implemented options provide high quality habitat. The quality of option implementation was assessed during LM0465 for arable, grassland and hedgerow options, building on previously established techniques, and the results should be used as a theoretical basis for altering habitat cost to account for option implementation quality.

- *Options are applied to grid cells containing a landcover on which the option can be used within a parcel, with only one option applied per parcel using a hierarchical approach.*

The hierarchical approach, as well as selecting only one option per parcel, could mean the combination of options within a parcel actually results in a larger or smaller cost to species, compared to that of the option selected through the hierarchical approach. This assumption should be tested using the exact option locations, meaning that more than one option is possible per parcel. Where possible, further exploration of the interaction of multiple options per parcel should be undertaken.

- *Not implementing maintenance options on core habitat resulted in no additional cost to species movement, whereas on landcovers with a cost to species movement, not implementing maintenance options increased the cost by 10%.*
- This assumes that the suitability of core habitats remains for the focal species if maintenance options were not implemented, and although some habitat degradation may occur, this would not be to an extent which would increase the cost to the species using the habitat. Testing this assumption is challenging due to the targeting of AES on maintaining high quality habitats, though evidence should be sought from the literature for previous studies including counterfactual sites. *Prior to the implementation of restoration options, it was assumed that habitats were in a heavily degraded state, resulting in a cost to species movement as well as an additional 25% cost on non-core habitat.*

This assumes that without restoration options, the habitat is unsuitable for the focal species, and consequently the cost assigned to this landcover in the absence of a restoration option could have a significant impact on connectivity. Assigning a low cost would have a smaller impact on the connectivity of the remaining suitable habitat. This assumption should be tested with information on habitat quality prior to restoration option implementation where possible (e.g. BEHTA surveys, farmer adviser interviews).

- *The CEH 2015 Landcover Map combined with Priority Habitat Inventory is a true representation of the base land cover prior to option implementation.*

This assumption should be tested with available habitat data (e.g. BEHTA surveys, Phase 1 and 2 habitat surveys, satellite imagery).

- *Linear matrix options were assumed to reduce the cost of movement by 10%.*

The impact of linear matrix options on the different focal species should be investigated, as different species will be impacted in different ways, depending on how closely related the linear feature is to the species' core habitat. For example, a high quality hedgerow may reduce movement costs by 100% for some woodland species. Further to this, the combination of linear options and adjacent habitat or options should also be investigated, to identify the impact of boundary features for connectivity. This assumption should be investigated to assess whether this reduction in movement holds for all the focal species, and the impact of this at the landscape scale.

Modelling resolution:

A grid resolution of 50m was used for species modelling in LM04100 to enable computer processing at the national scale, however features below this scale are unlikely to be accurately captured in species modelling (e.g. hedgerows, ponds). Using the chosen study areas (or a sub-area depending on computing limitations), the impact of increasing the resolution of landscape layers should be determined to identify at what resolution connectivity estimates do not materially change for increasing resolution, taking into consideration the limits of the datasets available. The smallest resolution required would likely be ~5m to capture linear options such as hedgerows and ditches.

#### **Task 4 – Testing of connectivity metrics and landscape change scenarios.**

The aim of this task is to test the sensitivity of different connectivity metrics to changes in the spatial arrangement and habitat condition of AES options within a landscape. This task will compare the least cost pathway approach refined above with the three connectivity metrics being explored for the 25YEP D1 Indicator (Quantity, quality and connectivity of habitats – Annex 2), for a number of landscape change scenarios. The three connectivity metrics to be tested alongside the least cost pathway are:

1. Rules of thumb (Nature Network Evidence Handbook, Crick et al., 2020) – Calculation of the percentage of a landscape that is covered by habitat and the nearest neighbour distances of all habitat patches. The metric is the proportion of patches that have a nearest neighbour  $\leq 1$ km away.
2. Habitat fragmentation index (National Biodiversity Climate Change Vulnerability tool, Taylor et al., 2014) - Combination of two measures; habitat aggregation and friendliness of the surrounding matrix, using a kernel-based approach, for 200m by 200m cells in the landscapes.
3. Condatis (Hodgson et al., 2012) – Calculation of a flow speed metric representing the connectivity of the whole landscape from a source to target location, using electric

circuit theory. Further use of the software enables bottlenecks to be identified, as well as 'adding' or 'dropping' functions which aid identifying the most beneficial habitat for connectivity.

The landscape change scenarios will compare the actual AES option placement, with three scenarios which represent different approaches to habitat creation across the landscape:

- Aggregated habitat: AES creation options placed next to existing habitat to make patches bigger.
- Dispersed habitat: AES creation options placed at random within the study area
- Stepping stones: AES creation options placed to connect existing habitat patches.

### **Task 5 – Field surveying**

The field surveying will be undertaken in phase 2 of this project, and will determine habitat quality in relation to connectivity, informing the land cover cost layer of the species connectivity modelling to be undertaken later in the project. The preparation for field surveying will be carried out in phase 1 of the project.

In year one (20/21) field survey protocols should be developed to assess habitat quality within the study area, specifically considering the impact of AES options on habitat quality and in relation to the connectivity of the focal species selected. Methodologies should use or be developed from previous agri-environment monitoring protocols (e.g. GREEN project – LM0450, CS Baseline project – LM0458, Landscape-scale species monitoring – LM0465, HLS Resurvey - LM0445), but should be specific to measuring environmental aspects which will impact mobile species connectivity.

Specific existing work which will contribute to this task include option implementation scoring as part of LM0465, the Rules of thumb described in the Nature Network Evidence Handbook (Crick et al., 2020) and ongoing work on the 25 YEP D1 Indicator (Annex 2). Details of the 25 YEP D1 Indicator development and LM0465 methods will be shared with the successful contractor.

Agreement holder or facilitation fund group member questionnaires may be developed to assess how well agreement holders collaborate to deliver ecological connectivity at the landscape scale. These should build on the work completed by the Facilitation Fund projects (LM0473 and LM0479). If a survey is to be undertaken as part of this study, approval will need to be gained from the Survey Control Liaison Unit (SCLU) in Defra (see below).

A sampling strategy should be designed for surveying which will answer the research questions for this project. Natural England can assist with finding suitable sites and will supply the agri-environment scheme agreement data required for planning the field survey. Contractors should submit a proposal for a workable number of sites and locations, based on the objectives of the study and proposed methods.

Natural England will send an initial letter to agreement holders notifying them of the intention to survey. The contractor will then be responsible for subsequent liaison with site managers to arrange a suitable time to visit and undertake the field survey.

All fieldwork should be completed during 2021 and surveys should be carried out at an appropriate time of year.

Data should ideally be collected in the field using electronic data capture. Should this not be feasible, data will need to be captured on paper forms and entered subsequently into a fit for purpose database, developed by the Contractor, which will need to be agreed with the PSG. The database should be designed to function within a commonly accessible application such as MS Access and Excel. A data management plan for the field surveying and subsequent connectivity modelling should be provided with the project plan at the beginning of the contract.

#### **Task 6 – Analysis & connectivity modelling from field based quality assessment**

New land cover cost layers should be generated for the study areas based on the condition assessments carried out in the fieldwork task. From this, the connectivity metrics listed in task 5 should be re-run and comparisons made between the desk and field based analysis. Evaluation of the impact of using field based condition assessments in connectivity modelling should be made, with discussion regarding the issues arising from these methods, as well as the different connectivity metrics used.

#### **Outputs**

The specific outputs of this project are listed below.

1. Monthly updates to the NE project manager on project progress. The form of these updates will be agreed in the inception meeting.
2. An interim project report due February 2021, covering interim findings from tasks 1 to 4 and fieldwork preparation from task 5.
3. A comprehensive final written report, externally peer reviewed, covering all objectives and tasks of the project. The draft final report should be available to the steering group for comments by January 2022, with a final version due 1<sup>st</sup> March 2022.
4. Well documented and annotated code which is capable of reproducing any analysis using open and freely available data. Any non-code analysis or data processing to be fully documented.
5. Steering group meeting to present/discuss the final report.
6. A 2-page summary report, summarising the aims, outcomes and implications of the project, for use by policy colleagues, and other non-specialists. The summary should use the template provided by Natural England.
7. Webinar presentation to Natural England staff and interested parties, including the results and findings of the project.

8. All data and metadata collected or generated during the project, including any hard copies of field sheets and associated spreadsheets populated with data will be provided to Natural England at the completion of the project. All data tables should be accompanied by associated metadata.

### **Reporting and Milestones**

The project will run from November 2020 – March 2022. In order to assist the NE project manager to observe the progress we request that include sufficient milestones within the project that will demonstrate the progress of the research. Compulsory milestones are as follows:

1. November 2020: Project plan, including a data management plan, to be submitted following the inception meeting.
2. February 2021: Interim report on tasks 1 to 5 and finalised details of the approach to the field survey.
3. January 2022: Draft final report will be provided to Natural England and steering group meeting to present/discuss results will be arranged soon afterwards.
4. March 2022: Finalised, peer-reviewed report, and accompanying final 2-page summary.
5. March 2022: Webinar presentation outlining the main results of the project suitable for key staff at Natural England and the wider Defra group, by the end of March 2022. The webinar will also be recorded for NE's skills port to deliver wider dissemination within NE and Defra. This is expected to be in the format of a PowerPoint presentation and conference call.

This project will be paid by milestones, however not all milestones need to be associated with payment. It may be appropriate to include additional milestones that are not related to payment, to be used to indicate progress within the project. The frequency of milestone payments should be determined by the contractor, however, we request that they are appropriate and not at a frequency greater than every month.

The format of the final report will be agreed between the project manager and project leader. Natural England and Defra require the opportunity to comment on the draft final report (approximately 4 weeks). The successful contractor will be responsible for ensuring both the quality of the work as well as the presentation of the material (e.g. proof reading, ensuring clear English). The appointed contractor is also to be aware that Natural England requests acknowledgment in the publication of its funded research. All reports should be provided in MS Word and PDF format.

Bidders should be aware that Natural England and Defra intend to publish final reports. The contractor will be responsible for arranging peer review of the final report (see below).

### **Peer Review**

A comprehensive, externally peer-reviewed final written report suitable for publication as a Defra Science report, covering all objectives and tasks of the project. The contractor will be

responsible for arranging peer review of the final report by 2 appropriate reviewers, to be agreed with the PSG.

For carrying out the peer review, Natural England will provide:

1. A form for peer reviewers to complete to guide them through key questions.
2. A declaration for reviewers to sign regarding the use of confidential information and any conflicts of interest.

There should be a minimum of two peer reviewers and they must be independent of organisations working on the project. A cost for peer review should be itemised in the tender. This should take into account staff time to organise the peer review, staff time to edit the report in light of the reviews (subject to PSG agreement) and cover costs for reviewers if required.

### **Project Management & Timescales**

The project is expected to start on 23rd November 2020 and finish no later than 31<sup>st</sup> March 2022.

- It is envisaged that the tasks 1, 2 will be completed, tasks 3 and 4 will be partially completed and fieldwork preparations of task 5 will be completed during the first phase of the project and no later than 28<sup>th</sup> February 2021.
- The second phase will be subject to confirmation of available funding and successful delivery of the first phase. The second phase will involve finalising tasks 3 and 4, carrying out the fieldwork in task 5 and task 6, and producing a final written report.
- Confirmation of the second phase will be communicated to the Contractor before March 2021 and confirmed by both parties via a change control note. The Contractor should be aware that any work undertaken before an electronically approved CCN is approved by both the Customer and the Contractor is undertaken at the Contractors own risk.
- The successful contractor should appoint a project leader. The project leader will be responsible for the management and delivery of the project and will act as the liaison point with the Natural England project manager.
- Natural England will establish a project steering group (PSG) to oversee the contract including representatives from NE and Defra and other relevant partners. A project initiation call between the contractor and the NE project manager will be required within one week of the start of the contract, and a project inception meeting between the contractor and the PSG will be required within two weeks of the start of the contract (usually at a Defra/NE office, to be agreed based on the location of the contractor and PSG members, however this may be a teleconference).
- The PSG will meet will meet up to three further times each financial year throughout the course of the project, by teleconference or face-to-face, as appropriate to discuss findings. The project officer/successful contractor (as appropriate) will be responsible for setting up these meetings.

- Secretariat and production of minutes from meetings is the responsibility of the successful contractor, who will share meeting minutes with the project team, NE and the steering group, where applicable.
- The successful contractor will send a short (no more than 1 page A4) progress update to the NE project manager once a month. The form of these updates will be agreed in the inception meeting.
- Bidders are reminded that cost is one of the factors that will be considered when assessing bids.
- Research contracts are let on a firm price basis (excluding VAT). This is an all-inclusive price for the contract and, so long as the scope of the contract remains the same, it is not subject to any review, amendment or alteration.

### **Surveys**

If a survey is to be undertaken as part of this study, approval will need to be gained from the Survey Control Liaison Unit (SCLU) in Defra. Any structured approach made by or on behalf of the Government in order to obtain aggregated data is classed as a statistical survey and should be referred to Defra's Survey Control Liaison Unit (SCLU). This also applies to customer satisfaction surveys.

Exceptions are:

- surveys addressed to respondents in central Government or its Agencies (e.g. staff surveys);
- surveys where the respondents select themselves without a direct approach from us, e.g. surveys carried out via a website;
- readership surveys where a questionnaire is sent out together with the material concerned;
- consultation exercises where there is an invitation to comment generally rather than a structured list of questions;
- surveys addressed to the general public (as opposed to ones which contact people in their business capacity). However, SCLU need to be advised so that the survey can be registered on the Department's record and included in the Annual Report to Ministers; and
- surveys to fewer than 25 respondents.

NE and Defra are strongly committed to minimising the burden they place upon businesses and local authorities. As a result proposals for new surveys must be assessed by the Survey Control Liaison Unit (SCLU). In order to undertake the survey of agreement holders, proposed as part of this project, approval will need to be gained from the SCLU. NE will make the initial application, but, following outline approval the successful contractor(s) will be required to provide a draft questionnaire to be agreed and approved. A period of at least 6 weeks should be built into the project plan to accommodate this survey approval process.

It is the responsibility of the successful bidder to ensure that the survey is provided in accordance with the time requirements of this project for SLCU approval.

### **Property rights, publication and confidentiality**

All data resulting from this project, project documents, code and other materials will be the property of Natural England. Any code, models and data collected will be made openly and publically available.

All data used within this project must be licensed by Natural England and all data licensing must be agreed with Natural England by contacting [data.services@naturalengland.org.uk](mailto:data.services@naturalengland.org.uk) prior to data being obtained and analysis commenced.

Natural England and Defra intend to publish the final project report as a Defra Science report. The published report will be made available on the Natural England and Defra Science websites. It is likely to be shared directly with partners as part of regular liaison over agri-environment policy and delivery.

Natural England encourages widespread publication, and welcomes the use of appropriate trade press, peer-reviewed journals and sector-specific journals, but it is a requirement that all plans to communicate outcomes, including publications and oral presentations, from funded research are agreed with the project manager (who will ensure Natural England and Defra QA requirements are met) before publication or presentation.

The Contractor(s) will be responsible for ensuring the quality of the work, the presentation of the final report and any other material to be published.

## References

[LM0450](#) - Evaluating the relative importance of site and landscape characteristics on the effectiveness of restoring species-rich grassland communities through agri-environment schemes.

[LM0464](#) - Initial Evaluation of the implementation of Countryside Stewardship in England.

[LM0479](#) – Countryside Stewardship Facilitation Fund Phase 2.

LM04100 - Agri-environment scheme contribution to ecological connectivity.

[BD5010](#) - 'Synthesising Review' of the use of Environmental Stewardship for restoring, maintaining and enhancing a coherent ecological network in England.

Edwards, J., Knight, M., Taylor, S., & Crosher, I. (2019) *Natural England's National Habitat Networks Mapping Project*. Natural England.

Crick, H. Q. P., Crosher, I. E., Mainstone, C. P., Taylor S. D., Wharton, A., Langford, P., Larwood, J., Lusardi, J., Appleton, D., Brotherton, P. N. M., Duffield, S. J. & Macgregor N. A. (2020) *Nature Networks Evidence Handbook*. Natural England Research Report NERR081. Natural England, York.

Hodgson, J. A., Thomas, C. D., Dytham, C., Travis, J. M., & Cornell, S. J. (2012). The speed of range shifts in fragmented landscapes. *PloS one*, 7(10), e47141.

Lawton, J.H., Brotherton, P.N.M., Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J., Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.J., Tew, T.E., Varley, J., & Wynne, G.R. (2010) *Making Space for Nature: a review of England's wildlife sites and ecological network*. Report to Defra.

**Annex 1 – LM04100 draft report**



**Annex 2 – 25 Year Environment Plan D1 Indicator – Quantity, quality and connectivity of habitats**

Title	D1 (H9) Quantity, quality and connectivity of habitats
Short description	<p>This indicator will measure changes in extent, condition, connectivity and function of terrestrial and freshwater habitats in England.</p> <p><a href="#">‘Making space for nature’</a>, an independent review of England’s wildlife sites and the connections between them by Professor Sir John Lawton, identified the need for more, bigger, better and more joined areas to build a more resilient ecological network for wildlife. Such resilience is necessary as an adaptation to pressures and drivers of change such as climate change.</p> <p>Data are available to measure some aspects of this indicator such as extent and condition of some habitats, but further work is required to assess habitats beyond protected sites, and reliable methods for measuring ecological connectivity need to be further tested. Some indicators of aspects of ecosystem functions and processes are available but these are not comprehensive. New methods of Earth Observation (EO) together with development of measures of favourable conservation status and long-term site-based monitoring offer good opportunities to develop this indicator.</p>
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife Mitigating and adapting to climate change.
Relevant target(s) in the 25 Year Environment Plan	Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected area network; Implementing a sustainable and effective second National Adaptation Programme.
Position in the natural capital framework	Asset condition – species and ecological communities
Related reporting commitments	Contributions to EU Habitats Directive Article 17, Convention on Biological Diversity Aichi Targets 5 and 15. May provide evidence in support of Climate Change Risk Assessment and



### **(2.5) Contract Monitoring Arrangements**

For the avoidance of doubt the services required are being provided under Framework Agreement 22707

### **3. PRICE AND PAYMENTS**

**(3.1) Contract Price payable by the Authority excluding VAT, payment profile and method of payment (e.g. Government Procurement Card (GPC) or BACS))**

Financial year 20/21: ██████████

Financial year 21/22: ██████████

**Total: £212,050.00**

### **(3.2) Invoicing and Payment**

The Supplier shall issue electronic invoices in arrears following completion of appropriate milestones.

### **4. Invoicing Requirements**

All invoices should be addressed to Natural England and sent to the Natural England Project Officer.

**BY APPROVING THIS ORDER FORM THE CONTRACTOR AGREES** to enter a legally binding contract with the Authority to provide to the Authority and natural England the Services specified in this Order Form, incorporating the rights and obligations in the Call-Off Contract that are set out in the Framework Agreement entered into by the Contractor and Defra on 19 November 2020.

### **Electronic Signature**

Acceptance of the award of this Contract will be made by electronic signature carried out in accordance with the 1999 EU Directive 99/93 (Community

framework for electronic signatures) and the UK Electronic Communications Act 2000. Acceptance of the offer comprised in this Contract must be made within 7 days and the Agreement is formed on the date on which the Contractor communicates acceptance on the Customer's electronic contract management system ("Bravo"). No other form of acknowledgement will be accepted.

## Appendix 1: Pricing Schedule

No.	Item	Staff Grade	Day rate £	No. of days	Financial year	Total price (ex. VAT) £
1	Project Management	████	████	████	████	████
		████	████	█	████	████
2	Task 1: Identify associations between AES options, habitats and mobile species, building on those relationships identified in LM04100 and LM0448.	████ ████	████ ████	█ █	████	████
3	Task 2: Study area selection & data collation.	████ ████ ████	████ ████ ████	█ █ █	████	████
4	Task 3: Connectivity Modelling Assumption Testing	████ ████	████ ████	█ █	████	████
		████ ████	████ ████	█ █	████	████
5	Task 4: Testing of connectivity metrics and landscape change scenarios.	████ ████	████ ████	█ █	████	████
		████ ████	████ ████	█ █	████	████
6	Task 5: Field surveying	████ ████	████ ████	█ █	████	████
		████ ████ ████	████ ████ ████	█ █ █	████	████
7	Task 6: Analysis & connectivity modelling from field based quality assessment	████ ████	████ ████	█ █	████	████
8	Reporting	████ ████ ████	████ ████ ████	█ █ █	████	████
		████ ████ ████	████ ████ ████	█ █ █	████	████
9	Peer review				████	████
10	Travel & Subsistence				████	████
11	Computing				████	████
12	Total exc VAT					212050

Appendix 2 – Fera Science Ltd bid

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## SCHEDULE 1 - PROCESSING, PERSONAL DATA AND DATA SUBJECTS

1. This Schedule shall be completed by the Customer, who may take account of the view of the Contractor, however the final decision as to the content of this Schedule shall be with the Customer at its absolute discretion.
2. The contact details of the Customer Data Protection Officer are:  
  
[dgc.gdpr@defra.gov.uk](mailto:dgc.gdpr@defra.gov.uk)
3. The contact details of the Contractor Data Protection Officer are:  
  
[REDACTED]  
[REDACTED]
4. The Contractor shall comply with any further written instructions with respect to processing by the Customer.
5. Any such further instructions shall be incorporated into this Schedule.

Data Processing descriptor	Narrative
Identity of the Controller and Processor	The Parties acknowledge that for the purposes of the Data Protection Legislation, the Customer is the Controller and the Contractor is the Processor in accordance with Clause 13.1.
Subject matter of the processing	The processing is required to ensure that the Processor can effectively deliver the contract effectively
Duration of the processing	The duration of the contract (23/11/2020 – 31/03/2022).
Nature and purposes of the processing	Contact details of agreement holders will be shared to allow the contractor to carry out the requirement.
Type of Personal Data	Names, email addresses and telephone numbers.
Categories of Data Subject	Agreement holders

Plan for return and destruction of the data once the processing is complete

UNLESS requirement under union or member state law to preserve that type of data

Data will be returned to Natural England at the conclusion of the contract.