FRAMEWORK AGREEMENT SCHEDULE 4

ORDER FORM/
WORK PACKAGE ORDER

FROM

Authority	Secretary of State for Environment, Food and Rural Affairs
Address	Defra Group Commercial 2nd Floor, Foss House 1-2 Peasholme Green York YO1 7PX
Contact Ref:	Via Bravo messaging or Email: Network.Procurement@Defra.Gov.uk
Order Number	Ref: ECM 53737
Order Date	10th December 2018

TO

Contractor	Land Use Consultants
For attention of:	Name: [redacted] Phone: 02073 [redacted] E-mail: [redacted]
Address	43 Chalton Street London NW1 1JD

1. SERVICES REQUIREMENTS

(1.1) Services and deliverables required:

1. Project objectives

A current assessment of the retention or loss of reversion grassland is needed to understand the effectiveness of arable reversion options, where and why the arable reversion has subsequently been abandoned (ploughed-out) and what impact this may have on natural capital.

The overall aims of this project are to:

1. Provide evidence on the current status of environmental assets supported through arable reversion within AE schemes and the effects where assets have fallen out of a scheme;

2. Evaluate the overall effectiveness of arable reversion on the different environmental assets under AE schemes

3. Identify where land use has changed after the loss of AE payments; and:
    - understand the reasons for these changes and what would influence longer retention of grassland;

- assess the impact that land use change has had on the environmental assets;
- assess the impact of this change in terms of Natural Capital Accounting both strategically and at a local scale,

4. Draw conclusions on how the range of Natural Capital benefits could be supported better in the use of arable reversion, including:
   - a revision of the option requirements/guidance to consider the potential for adding value or indeed reducing requirements to focus on primary objectives,
   - cost benefit analysis of arable reversion

2. Tasks

Task 1 - Quantify the retention and loss of grassland established through arable reversion options through the analysis of spatial and remote sense data

Use Agri-environment scheme uptake data, spatial data and CropMap to undertake a spatial analysis to:

a) Identify the location of arable reversion and where arable reversion has been subsequently lost through agri-environment scheme data and CropMap.
b) Calculate the area (ha) committed to arable reversion across the different reversion objectives and schemes and the area (ha) of arable reversion which has been lost.
c) Analyse geographic differences in arable reversion uptake and loss after agreement expiries.
d) Analyse crop type replacing the reversion
e) Analyse patterns of loss and retention - location, field size, specific grass mixture sown if known, year, objective, duration of scheme.

For arable reversion established under Environmental Stewardship, the spatial analysis should be carried out to look at how arable reversion delivery and retentions differs depending on environmental asset, including:

- resource protection,
- grassland for birds, pollinators and other target species (biodiversity),
- historic environment.

See Annex 2 for which options fall under each environmental asset.
The analysis should also consider what effect the replacement crop is having for the environmental asset, and whether it could be considered positive, benign or damaging.

Arable reversion in Agri-environment data

The contractor will have to use a selection of Agri-environment scheme data to compile and identify cases of arable reversion through tabular data and spatial analysis. This will include Agri-environment data from the following schemes: Classic Countryside Stewardship, Environmentally Sensitive Areas, Environmental Stewardship and Countryside Stewardship. This Agri-environment data should then be linked with CropMap, or other

suitable spatial data at the parcel level, to investigate if arable reversion has been continued or lost.

The persistence of arable reversion, or its loss, is likely to occur at the end of an agreement, often as an agreement holder changes from one scheme to another, or drops out of any scheme. For example, arable reversion started under Environmental Stewardship (see relevant options; Annex 2) may be lost or continued as the agreement holder enters Countryside Stewardship or ends up with no agreement.

This project is ultimately interested in all cases of arable reversion being kept or lost, across England and across all Agri-environment schemes (CSS, ES and CS). However to be able to practically focus on arable reversion, it is anticipated the work will need to focus on specific types of arable reversion (see Annex 2 for more details).

Task 2 - Conduct a survey of land managers and AES agreement holders to assess the impacts of arable reversion and the reasons for its retention and loss

Tenderers are required to devise a semi-structured survey to meet objective 2, outlined above. It is likely that the survey design will be defined or guided by trends in arable reversion retention or loss identified in the data analysis from task 1.

The key requirement of the surveys is to understand land managers' motivations and reasons for removing or retaining arable reversion. The researcher may also assess whether participant observation, to better understand the farm system and practical constraints and opportunities, would lend benefit to the survey. Researchers / surveyors must be familiar with the literature on farmer behaviours and rural sociology research (which addresses motivation to engage, retention of pro-environmental management etc.). The survey will then investigate specific variables appropriate to the environmental asset under protection from reversion. Objectives for inclusion in the survey questionnaire or any associated data analysis deemed appropriate by tenderers are outlined in Annex 1.

Tenderers should consider mixed survey methods to obtain both qualitative and quantitative data, and consider using different behaviour change models, such as ISM where you structure your data collection around understanding the Individual (e.g. beliefs, self-efficacy, skills etc.), Social (e.g. peer support, advice available, social capital), and Material (e.g. tenure, equipment available) factors and how these create barriers or opportunities to the farmer maintaining the current land management practices/behaviours.

Tenderers are invited to propose the method by which surveys and data analysis will be undertaken based on their understanding of the desired outcomes of the project, including estimated sample sizes for survey in order to deliver robust results. We anticipate face to face interviews are unlikely to be cost effective.

All works must adhere to NE's ethic requirements:

1. ***Sound research methods and appropriate dissemination and utilisation of the findings.*** Ensuring the research meets a clear organisational need, doesn't place and unnecessary burden on respondents, and is based on sound methods that ensure evidence is robust, usable and accessible.
2. ***Participation based on valid informed consent*** – it's clearly voluntary and participants have sufficient information to decide whether to take part.
3. ***Enabling participation*** through method and sample design with consideration given to likely barriers to participation and reasonable steps taken to address these.
4. ***Avoidance of personal and social harm*** including avoidance of undue stress.
5. ***Non-disclosure of identity and personal information*** ensuring confidentiality and data protection and that participants are not identified or identifiable in research outputs.

For more info, see https://www.gov.uk/government/publications/ethical-assurance-guidance-for-social-research-in-government

Although the final design of the survey will be informed by task 1, the guideline amount is 200 telephone interviews. For example the survey could be split into 6 groups: ESA to ES transfers with arable reversion lost and retained (2 groups), CSS to ES transfers with arable reversion lost and retained (2 groups), ES to CS transfers with arable reversion lost and retained (2 groups). This gives 6 groups with a tentative minimum sample size of 30 per group. This would give 180 interviews, close to the 200 target.

Objectives of the land manager survey are to:
Attitudes & Intentions

a) Understand the main reasons for arable reversion under AE in the first place and retaining arable reversion outside AE
b) Explore the pressures behind decisions to plough out arable reversion land
c) Draw conclusions on ways to make arable reversion more viable/valued by the farmer

Farming & Economics

d) Assess likely drivers for loss versus retention
e) Consider the impact of grassland being part of a wider arable rotation

Task 3 - Evaluation of the state of arable reversion and effectiveness in supporting environmental assets and delivering Natural Capital benefits
The evaluation will synthesise findings from tasks 1 and 2 to develop an overall assessment of the impact of arable reversion uptake and retention under AES. This should be framed in the context of AE scheme design and implementation, Natural Capital benefits and farming sector and economic impacts.

This evaluation should build on the data collected in tasks 1 and 2, and we do not anticipate it will require further data collection. Instead it should draw on previous research and reports where appropriate.

The evaluation should address the following:

AE scheme design and implementation

a) In which situations has arable reversion most commonly persisted, and persisted for the longest time? This should consider: farm type, Agri-environment schemes and options, location, field size and findings from the farmer survey (Task 2).
b) Conversely, in what situations has arable reversion most commonly been lost or only persisted for the shortest period of time?

Environmental / Natural Capital

c) What benefits does arable reversion provide for broader ecosystem services? Useful sources of information for this include: [redacted] and the
d) On the basis of the provision of these ecosystem services, which schemes and options are likely to have provided the greatest benefits for ecosystems? This should be linked to the findings from task 2 which identifies how successful arable reversion has been across different options/schemes across the country.

Farming & Economics

e) Analyse whether arable reversion uptake, retention and loss differs between farm sectors (e.g. arable, dairy, upland, lowland.).
f) Using Agri-environment data, estimate the cost of arable reversion options and the amount of this money which paid for arable reversion which has since been lost.
g) Discuss land use changes after AE agreement expiry; and give consideration to:
    - The reasons for change and what would influence longer retention of grassland;
    - Impact of change on the environmental assets (e.g. resource protection, biodiversity, historic environment);
    - Impact of change in terms of Natural Capital Accounting both strategically and at a local scale.

3. Outputs

Specific outputs for this project, and the financial year in which they are due:

1. A Task 1 draft report for the project [2018/19].

2. A comprehensive written report covering all objectives and tasks of the project [2019/20].

3. A '2-page summary' report, using format in attached Annex A 'Summary Template' summarising the aims, outcomes and implications of the project, for use by policy colleagues, and other non-specialists [2019/20].

4. An infographic, to be developed with the Natural England project manager, highlighting notable findings [2019/20].

5. All data and metadata collected during the survey, including any hard copies of field sheets and associated spreadsheets populated with data will be provided to Natural England/Defra at the completion of the project [2019/20].

6. The contractor will present a webinar via the NE climate change network to present the results and findings [2019/20].

4. Reporting and milestones

The contractor will be required to produce:

- An interim report presenting the results from task 1 by 15th March 2019. The contractor will be expected to present the results of the data analysis to the project steering group, with an outline of how they will use this information to inform the development of the land manager survey.

- A draft final report (with an accompanying draft 2-page summary) will be provided to Natural England by 31st January 2020 and a meeting to present/discuss the results will be arranged soon afterwards. This should include full analysis, conclusions and discussion on the data collected against the requirements.

- The finalised, peer-reviewed report, and accompanying final 2-page summary and infographic, will be provided to Natural England by 15th March 2020.

- Produce and present a webinar outlining the main results of this project suitable for key staff at NE, Defra Policy, Environment Agency and Historic England. Other interested bodies will also be invited to attend such as Algao for HE interest, CPRE, NPE, NAAONB, LI for landscape interest Farm Advice Framework (FAF) and Farming Advice Service (FAS) contractors for RP interest by 31st March 2020.

  The webinar will also be recorded for NE's skills port to deliver wider dissemination within Natural England and Defra.

Draft final reports will be submitted to Natural England for comment. The 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 Contractor is also to be aware that Natural England requests acknowledgement in the publication (including oral presentations) of its funded research, and that the project manager is notified at least two weeks prior to publication. All reports should be provided in MS Word and PDF format.

The final report will be externally peer-reviewed (note: the contractor will be responsible for arranging peer-review by two appropriate reviewers, to be agreed with the Natural England project officer) and be suitable for publication as a Defra science report. Tenderers should be aware that Natural England and Defra will publish final reports. The final report will be

structured in a format that, if appropriate, facilitates rapid conversion into one (or more) papers suitable for submission to an appropriate peer-reviewed scientific journal.

Natural England is happy to encourage widespread publication and welcomes the use of appropriate trade press, peer-reviewed journals, sector-specific journals and appropriate use of social media.

Note: If the findings of the work are deemed suitable, the contractor will aim to submit a manuscript to a peer-reviewed journal as soon as possible after completion of the report, co-authored by staff from the contractor and Natural England, as appropriate. A proposed timetable for submission of manuscript and publication timeline will be agreed with Natural England.

5. Project Management and timetable

Duration
Early December 2018 – 31 March 2020.

The first phase of the project (completion of task 1), is to be completed by 15th March 2019. The second phase will be subject to confirmation of available funding and successful delivery of the first phase. The second phase shall involve carrying out tasks 2 and 3. Confirmation of the second phase will be communicated to the Contractor before March 2019 and confirmed by both parties via a change control note extending the contract from 1st April 2019 to 31st March 2020. 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.

Natural England will establish a steering group to oversee the contract including representatives from NE and Defra and other relevant partners. It is anticipated that the steering group will meet twice during the course of the contract, at the project inception stage (January 2019), to discuss the interim results following the farmer survey and planning of analysis (in financial year 2019/2020).

The contractor should appoint a project leader authorised to act on behalf of the contractor. 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.

The contractor will be expected to attend a project inception meeting, where they will need to provide a detailed proposal and plan for the assessment they will undertake and agree any variations with the project panel.

The project leader will be responsible for setting up interim meetings. Face to face meetings will occur in NE offices in Bristol.

A final meeting will be held once the draft report has been delivered, where the results can be discussed and the dissemination webinar outline agreed.

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 project leader will send a short (no more than 1 pg A4) written progress update to the NE project manager once a month. The form of these updates will be agreed in the inception meeting. The contractor must produce and update a risk assessment analysis of each stage of the works.

6. IPR and data sharing

All data resulting from this project, project documents, Intellectual Property Rights and other materials will be the property of Natural England.

To facilitate the project aims, NE's Data Services team will liaise with the successful contractor to generate a contractor data licence. The contractor will be responsible for applying to and liaising with the Data Services team in requisite time in order to obtain the necessary data. The project officer will assist in this and make a preliminary enquiry on behalf of the project but, following outline approval the successful contractor(s) will be required to provide a full data request as required to meet the detail of their tender.

Data will be supplied to the contractor via secure data sharing in a format to be agreed with the contractor and NE's data services / GIS team. This will comprise information relating to 'Classic Schemes' including the former Countryside Stewardship (CS) scheme, Environmentally Sensitive Areas (ESAs) that include arable reversion options (see Annex 2 for information on how data will be presented) and Environmental Stewardship (ES) scheme (see Annex 3 for information on how this data will be presented), and will include land parcel references alongside the chosen option code. The chosen contractor should then use the Land Parcel Information Service, Aerial Photographic coverage and the Rural Payments Agency CropMap (satellite data that maps crop types and was launched in 2016) to deliver the project objectives.

CropMap datasets are available as Open Data through the Open Government License at [redacted]

Natural England will provide a preliminary list of agreement holders and land managers with current or historic arable reversion AES management. The contractor will identify the survey sample and contact information will be supplied by NE via a secure sharing format.

All agreement information provided to the contractor for the purposes of this project, shall be kept securely, confidentially and disposed of at the end of the project. It must not be used elsewhere without prior consent. The supplier will be required to follow Natural England's data protection policy and only act on information provided under our instruction.

7. Survey Requirements

As 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.

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 contractor 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 contractor to ensure that the survey is provided in accordance with the time requirements of this project for SLCU approval

For Annexes 1, 2 and 3 see document Request for Mini-tender ref: Project 24946, dated 30 October 2018.

Contractor's Approach and Methodology

See Annex B

(1.2) Commencement Date: 17 December 2018

(1.3) Completion Date: 31 March 2019

(1.4) Extension, via Contract Change Note, to 31 March 2020
Subject to availability of funds and satisfactory Contractor performance.

2. PERFORMANCE OF THE SERVICES AND DELIVERABLES

(2.1) Key Personnel of the Contractor to be involved in the Supply of the Services

[redacted]

(2.2) Performance Standards

Natural England will establish a steering group to oversee the contract including representatives from NE and Defra and other relevant partners. It is anticipated that the steering group will meet twice during the course of the contract, at the project inception stage (January 2019), to discuss the interim results following the farmer survey and planning of analysis (in financial year 2019/2020).

The contractor should appoint a project leader authorised to act on behalf of the contractor. 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.

The contractor will be expected to attend a project inception meeting, where they will need to provide a detailed proposal and plan for the assessment they will undertake and agree any variations with the project panel.

The project leader will be responsible for setting up interim meetings. Face to face meetings will occur in NE offices in Bristol.

A final meeting will be held once the draft report has been delivered, where the results can be discussed and the dissemination webinar outline agreed.
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 project leader will send a short (no more than 1 pg A4) written progress update to the NE project manager once a month. The form of these updates will be agreed in the inception meeting. The contractor must produce and update a risk assessment analysis of each stage of the works.

(2.3) Location(s) at which Services are to be provided:

At the Contractor's premises as appropriate and as agreed with Natural England for interim meetings. Face to face meetings will occur in NE offices in Bristol.

(2.4) Standards:

Compliance with Health & Safety Policy, as per Framework Agreement.
Contractor delivery in accordance with bid submission E02 Ability to Deliver.

(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))

£75,850 for the entirety of the contract, divided:

[redacted]

See Annex C for full pricing schedule

(3.2) Invoicing and Payment

The Contractor shall issue an electronic invoice in arrears following completion of task 1. [redacted] for 2019-2020 the Contractor shall issue a second invoice in arrears following completion of tasks 2 and 3.

4. Invoicing Requirements

All invoices should be sent, quoting a valid purchase order number (PO Number), to: Accounts-Payable.neg@sscl.gov.uk or Shared Services Connected Limited, PO Box 790, Phoenix House, Celtic Springs Business Park, Newport, Gwent, NP10 8FZ. Within 10 Working Days of receipt of your acceptance of this Work Purchase Order via Bravo, we will send you a unique PO Number. You must be in receipt of a valid PO Number before submitting an invoice.

To avoid delay in payment it is important that the invoice is compliant and that it includes a valid PO Number, PO Number item number (if applicable) and the details (name and telephone number) of your Customer contact (i.e. Contract Manager). Non-compliant invoices will be sent back to you, which may lead to a delay in payment. If you have a query regarding an outstanding payment please contact our Accounts Payable section either by email to Accounts-Payable.neg@sscl.gov.uk or by telephone 0845 603 7262 between 09:00-17:00 Monday to Friday.

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 11 June 2018.

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.

[Title in the form of a question]?

ANNEX A

Agri-environment monitoring theme: [INSERT THEME AREA]

What are the issues?

[insert text]

What are the aims of the project?

[insert text]

Figure 1: [caption text] (Source: [insert]) [Delete above picture and replace]

Which policy areas will the research inform?

[insert text]

Department for Environment Food & Rural Affairs

This project is supported by the Rural Development Programme for England (RDPE) for which Defra is the Managing Authority, part financed by the European Agricultural Fund for Rural Development: Europe investing in rural areas

What are the results from the project and how will they be used?

[insert text which will automatically follow over to the second column]

Figure 2: [caption text] (Source: [insert]) [Delete above picture and replace]

Where can I find further information about this and related research?

[insert particulars to the contract on where details can be found]

Alternatively, please contact Defra's Sustainable Land and Soils Unit

E01: Approach and Methodology

Project aims and objectives

Our wider understanding of the context for this project is set out in document E02. More specifically, we understand that Natural England's objectives from this contract are to understand the effectiveness of different AES arable reversion options following an assessment of the amount of retention or loss of reversion grassland. Furthermore, Natural England wishes to understand the potential impact of this retention or loss on natural capital assets and services and how this may be addressed in the future.

Robust evidence and analysis is needed to deliver these aims, and our methodologies below set out how we will use our knowledge, experience and unique combination of technical capabilities to deliver these aims for Natural England.

The detailed objectives of the project that we will deliver are:

- Understand where and why arable reversion has not been retained and the implications for natural capital accounting at local and national scales.
- Provide evidence on the natural capital benefits provided by AES arable reversion options, and the impacts where arable reversion has not been retained once the AES agreement has ended.
- Evaluate the effectiveness of arable reversion on different natural capital assets and benefits under AES.
- Examine how natural capital benefits could be supported by more effective arable reversion options.

Methodology

Task 1 Quantify the retention and loss of grassland established through arable reversion options through the analysis of spatial and remote sense data

At Task 1 we will quantify the retention and loss of grassland established through arable reversion options, through the analysis of best available existing spatial and remotely sensed data.

We assume that we will have access to GIS shapefiles (or similar spatially explicit digital data) from NE, showing the location of all arable reversion AES options across England. We assume that this will indicate the year of reversion and other necessary attributes to perform the spatial analysis. The multiple sources of this data will be assessed for completeness and quality, before being conflated into a single view on AES uptake for this analysis.

This will then be compared with a similar shapefile of the current land cover of each field parcel, derived initially from CropMap and supplemented with the use of new satellite data from the ESA Sentinel satellites via https://data.envsys.co.uk/ and our experience of crop mapping from earth observation data.

Prior to use, quality of data will be assessed to ensure that it is suitable and fit for purpose. The NE AES databases of arable reversion options should be reliable and accurate for this work. Challenges may come from trying to confidently establish the 'current' land cover of each field parcel. The Crop Map of England (CROME), set up by the Rural Payments Agency (RPA) is a polygon vector dataset mainly containing the crop types of England. The dataset contains approximately 32 million hexagonal cells classifying England into over 20 main crop types,

grassland, and non-agricultural land covers, such as woodland, water bodies, fallow land and other non-agricultural land covers. The classification was created automatically using supervised classification (Random Forest classification) from a combination of Sentinel-1 and Sentinel-2 images for 2016 and 2017. The results were checked against survey data collected by field inspectors and visually validated. Environment Systems, under contract to the RPA, delivered a demonstration to the RPA of a system for delivering this crop mapping. It has since been taken on and delivered by RPA as CropMap, so we are very familiar with the approach and results. The key difference between the demonstration and operational roll out is the use of hexagonal cells rather than true field boundaries that both spatially look different, but that also confuse the classification results at the parcel level. To help add value to the CropMap we propose to include a sense-check of the results using the appropriately dated ESA Sentinel-1 and -2 imagery via the Environment Systems Satellite Data Services that will give the project access to automatically processed imagery for analysis. Sense-check analysis will include confirming appropriate NDVI, OSAVI and other indices for the arable reversion parcels, given their CropMap classification.

The spatial analysis itself will be technically straightforward, but there may be difficulties in certain interpretation, which would need careful agreement with NE and quality control on the analysis. Changes to the AES option (to a no AES option or an arable-focussed option) can provide additional support and confirmation of change away from reversion. We understand the difficulties of distinguishing sown grassland from arable land, from imagery, at certain times of year, such as in spring when growth is limited. Fallow land may be land that has simply been left unsown, or is sown with a specific seed mix.

It will be appropriate to identify change in the spatial analysis in different ways:

- Change away from arable reversion that is reasonably certain from CropMap and satellite imagery and confirmed by associated AES and other data;
- Change away from arable reversion which is less certain from CropMap and satellite imagery, and perhaps where AES data does not support the CropMap assessment.

The final output from Task 1 will be as set out in the specification (subject to the availability of the necessary metrics in the AES input data), and will include a summary of AES parcels in arable reversion that both remain in arable reversion and those that have changed, with an indication of the confidence in the assessment. Results can be summarised by type of reversion option, and spatially by geographic regions. The analysis will include location, size, type and date, as described in the specification.

Analysis by Agricultural Landscape Type or National Character Area allow us to identify any broad patterns in arable reversion and subsequent grassland retention or loss, and potential implications for landscape, historic and ecological character. Our team includes landscape, ecology and historic environment specialists who will assist in interpreting this spatial analysis.

Task 2 - Conduct a survey of land managers and AES agreement holders to assess the impacts of arable reversion and the reasons for its retention and loss

The survey of farmers and land managers will gather evidence regarding the impacts of arable reversion and the reasons for its retention and loss. We propose three key elements to Task 2:

- Survey design phase;
- In-depth telephone interviews with advisers, agronomists and agreement holders (covering quantitative and qualitative element); and
- A participant observation phase at appropriate events discussing arable reversion.

The overall survey design (Task 2a) will be agreed with the Project Steering Group (PSG) but we suggest that the preference would be to focus on areas where there were extensive areas of arable reversion, such as the Cotswolds ESA where there was an estimated 10,000 ha of arable reversion of which only an estimated 3,500 ha remained a few years after the agreements ended (Short et al 2014). We agree with the NE breakdown suggested:

- ESA to ES transfers with arable reversion lost and retained (2 groups);
- CSS to ES transfers with arable reversion lost and retained (2 groups); and
- ES to CS transfers with arable reversion lost and retained (2 groups).

This would provide a mix of geographically focused interviews (ESAs), alongside those of across most of England (ES and CS). The choice of ESAs might need to be discussed in the inception meeting with the PSG to secure coverage of the 4 aspects outlined in in Annex 1 would be included. We envisage that the telephone interviews would last less than an hour, in each of the 6 groups.

The in-depth telephone interviews (Task 2b) with farmers and land managers would secure specific details on particular arable reversion options and the subsequent loss or retention of these features and their management. High quality qualitative information and specific quantitative data can only be collected through direct conversations with agreement holders, advisers and agronomists.

We assume that Natural England would be able to provide a list of farmers and land managers to interview and this can be linked to their responses to the online survey. This can be discussed with the PSG checking to ensure that this approach is able to provide a robust sample for the in-depth interviews.

The analysis would include the experiences of agreement holders on entering and exiting schemes and options within schemes and cover the four key areas outlined in Annex 1. Whilst most studies have tended to differentiate sets of factors which motivate and influence farmers' decisions for joining AES aspects, it is clear that explaining participation in AES cannot be reduced to a single factor or determinant (Ingram et al 2013). However, it is clear that participation is strongly determined by the interaction of the scheme and option structure with the farm production context. There is a complex interplay of personal (age of farmer, attitude to conservation, level of education), farm household (e.g. succession plan) and farm business (in particular economic status influencing the ability to engage in new conservation) factors affecting participation (Mills et al 2016). Thus farmers' decisions are determined by the policy environment, institutional and advisory structures, family influences, farming culture, community and society and ultimately intentioned by the farmer acting as a problem solving individual (Ingram et al. 2013). Such interactions are best assessed through an in-depth interview. Where face-to-face interviews are not considered cost effective, it is preferable to undertake semi-structured telephone interviews where the interviewee has already agreed to be contacted and the interview undertaken. Crucially, farming communities and those adopting AES options are heterogeneous so a range of responses is anticipated.

A key element of the in-depth interviews is to focus the discussions about particular arable reversion types, as outlined in Annex 1. The in-depth interviews would gather data on the following:

- Issues relating to the initial incentive to implement arable reversion options (e.g. proximity to an SSSI or NNR, protection of historic feature);
- Agreement holders views of the economics of the arable reversion option
- Impact of the option on the farming system;

- Agreement holder's priorities when the scheme ended;
- Subsequent management and relationship with AES schemes;
- Environmental outcomes of arable reversion options;
- Potential adjustments to prescriptions and scheme flexibility to attract future adoption;
- Internal factors (relating to willingness and socio-psychological factors) and external factors (relating to ability) that affect environmental outcomes; and
- Exploration of financial incentives and effect on other factors and environmental outcomes;

The project team is aware that both surveys will need to be approved by the Survey Control Unit. Three weeks have been allowed for this in each case, although they could be considered together.

Finally as an optional element we could see some benefit of CCRI researchers attending events (Task 2c) offered by groups such as Countryside Stewardship Facilitation Fund, Innovative farmer or Farmer Cluster groups. Observing these events to assess how the arable reversion option was presented and received by farmers and land managers would enable the findings from the online survey and the telephone interviews to be tested further. For example, it is in these environments that the barriers and challenges to the adoption of these options tend to be more openly discussed.

Task 3 - Evaluation of the state of arable reversion and effectiveness in supporting environmental assets and delivering Natural Capital benefits

The third stage of the work will draw together and synthesise the findings from Tasks 1 and 2 to evaluate the role and effectiveness of AES arable reversion options in improving outcomes in terms of natural capital assets and benefits. This analysis will be set within the context of an assessment of the effects across different farm sectors, different environmental assets or benefits and spatial differences for example by National Character Area or broader Agricultural Landscape Type.

The evaluation will also consider the cost of funding arable reversion schemes (distinguishing between those which have been retained or lost following the conclusion of AES agreements) and a broad assessment of the implications for Natural Capital Accounting (positive impacts during reversion, losses where grassland is not subsequently retained).

The evaluation will draw lessons from the analysis in terms of the design and operation of AES arable reversion options. This could, for example, focus on findings for different farm types, natural capital assets / benefit types, or spatial patterns. It will explore ways in which the retention of arable reversion could be encouraged and supported through funding, advice, sharing best practice etc. It will also consider whether an approach focused on the natural capital assets / benefits in question would be more effective in delivering long term benefits.

As indicated in the project specification, we would ensure that the evaluation was structured around the following questions:

AES implementation

In which situations has arable reversion most commonly persisted, and persisted for the longest time?

We will draw on the findings from Tasks 1 and 2 to explore patterns of persistence by farm type, agri-environment scheme and scheme options, location, field size, farmer attitudes and broader spatial patterns such as National Character Areas or Agricultural Landscape Types. Equally importantly, we will identify those circumstances in which arable reversion has more commonly been lost or persisted for the shortest time.

Environmental / Natural Capital

What benefits does arable reversion provide for broader ecosystem services?

This will necessarily be a high level assessment based on current understanding of the ecosystem service benefits of arable reversion, and the focus and objectives of different AES options.

To undertake this part of the work we therefore propose building a profile of natural capital benefits and ecosystem services for arable reversion based on:

- Ecosystem Services from Environmental Stewardship – recognising this has a limited focus on soil, nutrients, water, genetic resources, pest regulation and pollination;
- Ecosystem Services Transfer Toolkit – focusing on the 'Lowland agriculture' habitat and the 'arable to grazing' management intervention. We will review the evidence sources and update them as appropriate; and
- Information on option objectives (historic environment, resource protection, biodiversity) which could be used to weight the services or benefits relevant to each. It is recognised that this is based on intentions rather than outcomes, but we believe should provide a more nuanced input to the profile alongside the research based aspects listed above.

Having prepared these profiles, we would apply them to the data on arable reversion option retention and loss generated in Task 1 to assess changes in the pattern of ecosystem service provision. This would allow us to assess which types of ecosystem service have experienced the greatest change (positive or negative) as a result of arable reversion and subsequent patterns of retention or loss at the end of option agreement.

Again, it would be possible to summarise these by farm type, or by spatial unit such as Agricultural Landscape Type or National Character Area.

Farming & Economics

What are the implications for farming practice and farm economics?

Analysis carried out as part of Task 1 will allow to identify whether arable reversion uptake, retention and loss differs between farm sectors (e.g. arable, dairy, upland, lowland). We will supplement this data analysis with the findings from the land manager survey to explore whether and why farmer attitudes towards reversion and loss vary by farm sector, or whether other factors (farm size, respondent characteristics etc.) are also important.

Drawing on information from the AES agreements and / or standard rates, we will estimate the cost of arable reversion options and the proportion that applies to arable reversion which has subsequently been lost. We will explore land use changes following the expiry of AES agreements, including:

- Farmers' motivation and reasons for not retaining arable reversion, including any factors (information, guidance, payment) that would encourage the longer retention of grassland;

- Drawing on data analysis above to quantify the impact of retention and loss on environmental assets in terms of grassland habitats created/restored and lost, archaeological sites safeguarded or placed at risk, landscapes 'conserved' or subsequently detracted by grassland loss, and implications for soil health and water quality.
- We will supplement this relatively high level assessment with case study information from the land manager survey which will provide greater detail on the scale of benefit and impact on environmental assets, exploring factors such as:
    - Characteristics of the fields included within arable reversion option agreements, including size, soil type, slope;
    - Wider landscape character and the role of grassland as a key characteristic;
    - Extent and nature of archaeological sites;
    - Historic land use and prevalence of grassland;
    - Grassland habitats created and their relationship with surrounding habitats; and
    - Issues of soil erosion, compaction and run-off.

Conclusions and recommendations

We will draw on the results of this analysis to develop overall conclusions about the retention of grassland created under AES arable retention options. Where appropriate, we will identify ways in which retention could be encouraged, or alternative approaches which might more effectively secure long term objectives for the types of environmental asset or benefit in question.

Summary – meeting specification

We can confirm that our quotation proposals meet the specification outlined subject the assumptions outlined in the text regarding data provision. We will deliver the following outputs in the project timescale proposed:.

- A report setting out the results of Task 1;
- A report covering all objectives and tasks of the project;
- A '2-page summary' report, summarising the aims, outcomes and implications of the project;
- An infographic highlighting notable findings;
- All data and metadata collected during the survey; and
- Presentation of findings in the form of a webinar via the NE climate change network.

ANNEX C

Pricing Table - LUC

Please ensure it is clear the cost of each item in each financial year

No.	Item	Staff Grade	Day £ rate	No. of days	Financial year	Total price (ex. VAT) £
1	Deliverable 1: Data analysis (Task 1)	Senior PM Project Manager Technical/Specialist Technical/Project	[redacted]	[redacted]	18/19	[redacted]
2	Deliverable 2: Survey design	Senior PM Project Manager Technical/Specialist Technical/Project	[redacted]	[redacted]	19/20	[redacted]
3	Deliverable 3: Conduct farmer surveys a) Cost per [redacted] telephone interviews b) Cost per [redacted] face to face interviews (if in proposed survey)	Senior PM Project Manager Technical/Specialist Technical/Project Senior PM Project Manager Technical/Specialist Technical/Project	[redacted]	[redacted]	19/20	[redacted]
4	Deliverable 4: Completion of project outputs and	Senior PM Project Manager	[redacted]	[redacted]	19/20	[redacted]

	reports	Technical/Specialist Technical/Project	[redacted]	[redacted]		[redacted]
5	Peer review		[redacted]	[redacted]	[redacted]	[redacted]
6	Travel & Subsistence	[redacted]	[redacted]	[redacted]	18/19	[redacted]
7	Travel & Subsistence	[redacted]	[redacted]	[redacted]	19/20	[redacted]
8	Any other costs				18/19	[redacted]
9	Any other costs				19/20	[redacted]
10	**18/19 total exc VAT**				[redacted]	[redacted]
11	**19/20 total exc VAT**				[redacted]	[redacted]
12	**Total exc VAT**				All years	£75,850