Department for Environment Food & Rural Affairs

Appendix 2 – Call-Off Procedure:

for The Research, Development and Evidence Framework 1

Tender Reference: C27361 – The Agricultural Land Classification System Full Technical Review

Date: 09 April 2025

1.0   Request for Proposal

1.1   The following document is to be used as a Call-Off template to be sent to all Contractors on a sub-lot by the Project Manager of the Contracting Authority for completion and return in accordance with the Call-Off procedures detailed in the Form of Agreement.

Research, Development and Evidence Framework				
REQUEST FOR PROPOSAL				
Project title:	The Agricultural Land Classification System Full Technical Review			
Call off Reference:	RDE745			
Atamis project ref (if applicable):	Project: C27361 Contract: C28644			
Cost Centre Code: **(for admin purposes only)**	10021222			
Date:	06 December 2024			
Contracting Authority (Defra and its arms-length bodies etc.)	Defra			
Commercial Contact (if applicable):	██████████████████████████			
Project Start Date	09 April 2025			
Project Completion Date	09 April 2027			
For any projects over the direct award threshold, full competition is required (i.e. all contractors on the Sub-Lot are invited to quote).	**Direct Award**		**Mini-comp**	X
Call off from Sub-Lot number	Sub-Lot 2.4 – Modelling Toolkits, Informatics and Comparative Life Cycle Assessment Services and run a mini competition.			

Clarification period ends:	06 January 2025 12:00 (GMT)
Proposal return date:	20 January 2025 23:59 (GMT)

Evaluation criteria:

E01 to E05 will be scored using the following scoring criteria:

• **For a score of 100:** Excellent - Response is completely relevant and excellent overall. The response is comprehensive, unambiguous and demonstrates a best-in-class thorough understanding of the requirement and provides details of how the requirement will be met in full.

• **For a score of 70:** Good - Response is relevant and good. The response demonstrates a good understanding and provides details on how the requirements will be fulfilled.

• **For a score of 50:** Acceptable - Response is relevant and acceptable. The response provides sufficient evidence to fulfil basic requirements.

• **For a score of 20:** Poor - Response is partially relevant and/or poor. The response addresses some elements of the requirements but contains insufficient / limited detail or explanation to demonstrate how the requirement will be fulfilled.

• **For a score of 0:** Unacceptable - Nil or inadequate response. Fails to demonstrate an ability to meet the requirement.

If the Tenderer scores 20 or less in respect of questions E01 – E05 they will be eliminated from the procurement.

Contractors: Failure to meet any minimum score threshold stated will result in the bid being removed from the process with no further evaluation regardless of other quality or price scores.

Quality	Weighting	70%
Price	Weighting	30%

Quality Sub-Criteria Weightings:		
E01. Understanding of Requirement	Describe your understanding of the requirements detailed in section 2 of this ITT. In doing so you should set out what you see as the policy opportunities and the technical and practical challenges of conducting this evidence review and delivering the expected outcomes and deliverables (Section 5).	10%

	Evaluation criteria	
	Your response should demonstrate:	
	- A clear understanding of the policy context. - Your understanding of the key technical and practical challenges associated with the project.	
	Your response must not exceed 2 sides of A4, font size 11. Any responses exceeding 2 sides of A4 will not be evaluated beyond the 2nd page. Links to other documents will not be considered as part of your response e.g. links to published documents online. Please upload a document with the filename: "E01 Your Company Name"	
E02. Approach and Methodology	Please detail the approaches to be adopted to achieve the objectives set out in the bid requirement. In particular, the Tenderer should state what will be delivered within the time and financial constraints of the programme, broken down for each of the individual outputs detailed in the specification, demonstrating a clear understanding of the requirements and consideration of issues. Please outline a proposed work plan to meet the project objectives; expected outcomes and output requirements, within the specified timetable (please include a Gantt chart). Please describe any resources that you think are relevant to delivery of the project such as mapping/modelling and data handling/analysis systems. Approaches and Work Plan will be included in the contract issued to the successful Tenderer, therefore please restrict your entry to the salient points and set these out clearly and concisely. **Evaluation Criteria:** Your response should demonstrate: An outline of the general aims of the project and specific evidence objectives (measurable and time bound), any	40%

interdependence (the extent to which the success of one objective depends on the successful completion of another), and where there are sub-contractors, clearly show the roles of each.

- How the work will be conducted in order to ensure that those objectives and steps are met.
- A work plan and detailed programme in Gantt chart format with key deliverable dates. The programme format should be generic, commencing from award (Week 0) and should show each activity in the project itemised under each specific objective with start and end times, timing of proposed progress meetings and scheduled dates for project deliverables. This should also outline an exit plan for successfully delivering the final products and project deliverables.
- How it will show awareness of other relevant evidence to inform the scoping work and exploration of datasets
- A degree of creativity in proposing solutions to the conceptual, methodological and data challenges that arise.

Please note: Tenderers should not include commercial values in their technical responses, all price information should be submitted in the commercial section only.

Your response must not exceed 10 sides of A4, font size 11. Any responses exceeding 10 sides of A4, will not be evaluated beyond this. Links to other documents will not be considered as part of your response e.g. links to published documents online. Please upload a document with the filename 'E02 Your Company Name'

E03. Project Team - Expertise, Capability and Experience	Please describe your recent experience and capability (within 3 years) in delivering projects that are relevant or comparable to this Specification of Requirements. Please include details of the number of years you have been involved in this activity. Please also provide details of the structure of the project team (including any sub-contractor/joint contractor if appropriate) and the key personnel who will be involved in delivering the project, outlining their roles and responsibilities along with demonstrable evidence as to their relevant skills and expertise to deliver the scope of services. Where sub-contractors/joint contractors are being used, please provide the name and address of the organisation, contact name, telephone number and email address. Please also specify if they are sub-contractor or joint contractor. Provide details of how skills and expertise of the project team will be maintained or improved throughout this contract. CVs should be attached as an annex; these must be specific to the requirements of this scope of services. **Evaluation Criteria:** Your response should demonstrate: • A track record in their respective fields relant to this project. • Experience of applying ecosystem services concepts and spatial mapping. • What specialist expertise and prior knowledge and experience you can bring to add value. • How the team's skills, knowledge and experience are relevant to meeting the project requirements. • Overall balance of the project team, recognising the potentially interdisciplinary nature of the work. • Clear reporting lines and an appropriate escalation procedure. Please do not repeat the level of detail of the CV(s).	20%

	Your response must be a maximum of 2 sides of A4 font size 11. (CVs no more than 2 pages each can be uploaded in addition to this). Any responses exceeding 2 sides of A4, and/or CVs exceeding 2 pages will not be evaluated beyond the 2nd side and 2nd page respectively. Links to other documents will not be considered as part of your response e.g. links to published documents online. Please upload a document with the filename 'E03 Your Company Name'	
E04. **Project and Risk Management**	Please identify the individual(s) who will have overall management responsibility for the research and/or identify the Project Director and nominate a representative for day-to-day contact with the Authority's Project Officer. Please set out how the project will be managed. Please also provide your risk assessment profile for delivering this specification. Your response should contain a list of relevant perceived risks to the project which could affect your ability to deliver the required outputs, an indication of the level of risk (high, medium or low) and the mitigation measures to be put in place. **Evaluation Criteria:** Your response should demonstrate: • Scope of consideration of the risk, rationale for assignment of risk levels, and appropriateness of mitigation measures, **specific to this project**. • Your organisational approach to project management and how this is implemented, including: plans for keeping the authority informed of progress made and any difficulties encountered. • The level of input and guidance that the successful Tenderer will require from the Authority's Project Officer and Steering Group; if there are proposals for consortium/sub-contracting arrangements, the measures that will be in place to effectively manage these arrangements throughout the contract; and clear reporting lines and appropriate escalation procedures.	15%

	Please note: Tenderers should not include commercial requirements in their technical responses, all price information should be submitted in the commercial section only. Your response must not exceed 3 sides of A4, font size 11. Any responses exceeding 3 sides of A4, will not be evaluated beyond this. Links to other documents will not be considered as part of your response e.g. links to published documents online.. Please upload a document with the filename 'E04 Your Company Name'	

E05.
Sustainability
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	The Authority has set itself challenging commitments and targets to improve the environmental and social impacts of its estate management, operation and procurement. These support the Government's green commitments. The policies are included in the Authority's sustainable procurement policy statement published at: https://www.gov.uk/government/publications/defra-s-sustainable-procurement-policy-statementWithin this context, please explain your approach to delivering the services and how you intend to reduce negative sustainability impacts. Please discuss the methods that you will employ to demonstrate and monitor the effectiveness of your approach.
	
	Evaluation Criteria:
	
	• Demonstrate that there is a sustainable policy in-place.
	Provide evidence how you will reduce the environmental impacts of delivering this contact that may include the following;
	    ○ Using innovative sustainable tools, techniques and technologies.
	    ○ The procedures and systems in place for communicating what needs to be done to improve sustainability to those engaged on this contract.
		15%

| | • Explain how you measure sustainability performance and be able to report to the Authority on progress if required.

Your response must be no more than one side of A4, minimum Arial font size 11. Please upload your response with filename 'E05_Your Company Name'. Please note your Sustainability Policy will be accepted in addition to this limit. | |

Specification: The Agricultural Land Classification System Full Technical Review

1. Description of work required – overall purpose & scope (including reporting requirements)

ALC System Background

The Agricultural Land Classification of England and Wales (ALC) provides a framework for classifying agricultural land according to the extent to which its physical or chemical characteristics impose long term limitations on agricultural use. The limitations may affect the range of crops which can be grown, the level and consistency of yield and the associated cost of farming the land. ALC places considerable emphasis on the range of cropping possible as well as the potential of land to support consistently high yields of a narrower range of crops.

The principal physical factors influencing agricultural production are climate, site (e.g., gradient or microrelief) and soil. These factors, together with interactions between them, form the basis for classifying land into one of six grades from Grade 1: excellent quality to Grade 5: poor quality. Grade 3 land (good to moderate quality) is split into two subgrades. Subgrade 3a is good quality agricultural land and Subgrade 3b is moderate quality agricultural land.

The ALC system was introduced in the 1960s when MAFF Technical Report 11 (MAFF, 1966) outlined a national system of agricultural land classification. This led to the strategic mapping of ALC grades across all England and Wales, at a scale of one inch to the mile (1:63360). The mapping was completed in the mid-1970s and termed the 'Provisional ALC' maps. Following publication of the Provisional maps, two further reviews led to the ALC system being updated in the 1970s (MAFF, 1976) and a very comprehensive review during the 1980s (MAFF, 1988). As the 1988 guidelines are the most current, it means the Provisional ALC maps are based on a superseded version of the ALC guidelines.

The 1988 review also led to the criteria[1] used to assess climatic limitations and climate-soil interactions being updated based on the best and most up to date information available at the time. It is the only approved system for assessing agricultural land quality in England and Wales.

Welsh Government produced a Predictive ALC Map (2017) replacing the Provisional ALC Map (MAFF 1970s) in Wales and Defra is in the process of developing a similar mapping product for England.

Introduction

The primary purpose of the ALC system, since inception, is to identify high quality agricultural land so it can be taken account of in spatial planning, development management and land use decisions. The wording of planning policy varies between England[2] and Wales[3] yet the joint objective is to protect and conserve high quality agricultural land (the Best and Most Versatile – BMV) from loss to development by directing development to land of lower quality. The primary purpose and principles of the ALC system (as a BMV policy support system) remain unchanged and are not open to modification through this specific contract.

Currently land is graded in accordance with the guidelines and criteria established in 1988 (MAFF, 1988)[4]. As this is over 30 years ago, it is important that the guidelines, supporting science / data available are reviewed and updated to ensure they are valid and appropriate for the future. In addition, major advances in technology (e.g., GIS or remote sensing) since 1988 may provide better methods for assessing criteria that were not previously possible.

A significant body of technical publications supports the ALC system. Most recently Welsh Government, in consultation with Natural England, published a scoping study which assessed the factors needed to conduct a full technical review of the ALC system. The scoping study does not create a revised ALC system, instead it informs what is needed to update the system and is based on a technical review series consisting of 5 reports:

SPEP2018/19-12: ALC Technical Review - Part 1 - PSD, gradient, depth & stoniness
SPEP2019/20-04: ALC Technical Review - Part 2 - climate, site & interactive limitations
SPEP2020/21-02: ALC Technical Review - Part 3 - drought | GOV.WALES
SPEP2020/21-05: ALC Technical Review - Part 4 - Chemical | GOV.WALES
SPEP2021/22-01: ALC Technical Review - Part 5 - soil wetness | GOV.WALES
SPEP2021/22-02: ALC Technical Review - Part 6 - scoping study | GOV.WALES

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[1] Agricultural Land Classification of England and Wales: Revised criteria for grading the quality of agricultural land - ALC011 (naturalengland.org.uk)
[2] NPPF
[3] PPW 11, paragraph 3.58 and 3.59 https://www.gov.wales/planning-policy-wales
[4] https://webarchive.nationalarchives.gov.uk/ukgwa/20130402151656/http:/archive.defra.gov.uk/foodfarm/landmanage/land-use/documents/alc-guidelines-1988.pdf

To establish the scope of future updates to the ALC system, the scoping study reviewed available research of relevance to the ALC. Reviewed publications are listed in Table 3 of report SPEP2021/22-02[5] .

Requirement

The currency of the climatic data is main driver behind the project. The aim of this project is to ensure the ALC system is up to date, credible and fairly reflects agricultural land quality across England and Wales. In doing this, the system, its delivery and supporting resources need to be clear, user-friendly and have longevity without losing the technical credibility and sophistication of the underlying science and approach.

This project will require structured and systematic testing and validation at all stages. Ground truthing (reality checking) of new data or techniques could create feedback loops which will need addressing and must be factored into the bid.
Tenderers will be required to set out timelines, tasks which can be run concurrently, dependencies, and resources and expertise necessary to complete each work package.

Work Packages 4, 5, 6 & 8 represent the most complex and demanding tasks with several interdependencies and feedback loops. Tenderers will be expected to demonstrate a clear and logical approach to completing these tasks.

The system must reflect the reality of different farming systems in different parts of England and Wales. Minor changes to the climatic data / methodology could lead to system wide distortions in grading when compared to reality on the ground, which may require a return to basic principles to understand the issues and identify solutions. The contractor will also need to be mindful of work currently being commissioned by Defra to produce a new predictive ALC map for England, based on the current ALC grading criteria (MAFF,1988 – or refreshed doc). This work may flag up opportunities or additional issues to be aware of in a full update to the ALC system.

Proposed Method

The project requires the contractor to conduct a full technical review and update of the ALC system. A series of Work Packages and Tasks is envisaged, though not limited to the below, many of which will overlap and must be harmonized. These are based on Tables 16, 25, 26 & 27 along with the relevant chapters of Agricultural Land Classification Technical Review: scoping study | GOV.WALES:

Work Package 1 – Compilation of ALC Resources:
- **Task 1.1:** Collate documents
- **Task 1.2:** Review and identify gaps

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[5] https://www.gov.wales/agricultural-land-classification-technical-review-scoping-study

Work Package 2 – Climatic Exposure & Site Limitations
- **Task 2.1:** Wind Exposure
- **Task 2.2:** Frost Risk
- **Task 2.3:** Gradient
- **Task 2.4:** Microrelief
- **Task 2.5:** Flooding
- **Task 2.6:** Irrigation
- **Task 2.7:** Erosion

Work Package 3 – Soil Limitations:
- **Task 3.1:** Stoniness
- **Task 3.2:** Chemical Limitations

Work Package 4 – Interactive Limitations
- **Task 4.1:** Wetness & Workability including Soil Texture Class
- **Task 4.2:** Field Capacity Days
- **Task 4.3:** Soil Droughtiness

Work Package 5 – Climate Data
- **Task 5.1:** Climatic data methodology and processing
- **Task 5.2:** Climate (AT0/AAR relationship)
- **Task 5.3:** Climate extremes or episodic events

Work Package 6 – Testing & Trialling

Work Package 7 – Update of Systems
- **Task 7.1:** Incorporate all ALC criteria updates (replacement of the 1988 Blue Book)
- **Task 7.2:** Update the Predictive ALC Maps for England and Wales
- **Task 7.3:** Future proofing options

Work Package 8 – Implementation Planning & Delivery

Work Packages:

Work Package 1 – Compilation of ALC Resources:

Task 1.1: Collate documents: The Reading Archive[6]; ALC Instruction Manual (1992); ALC Technical Review Series; recent publications; documents and datasets referenced in this document; other relevant sources / publications.

Task 1.2: Review and identify gaps: short review of documents against SPEP2021/22-02: ALC Technical Review - Part 6 - scoping study | GOV.WALES to identify gaps / updated data sources of relevance to the project.

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[6] Scanned original ALC document – see accompanying spreadsheet.

Work Package 2 – Climatic Exposure & Site Limitations:

Task 2.1: Wind Exposure (*ALC Review, Section 9.3*)
Task 2.1.1: Review the Soil Survey of England and Wales (SSEW) wind exposure map (1980), Bell *et al*. (2020) summer wind exposure map for Wales, and available wind data. Produce a short report outlining the validity of the data and methods; longevity of the data; the sensitivity of including an infield assessment against relying on a mapped dataset, and options to produce a wind exposure map for England and Wales. This includes taking account of the sensitivity of cold spring winds (damaging to fruit and other horticultural crops including nursery stock) and salt laden winds around the coast (damaging to horticultural and early potato crops). Spring winds also give rise to wind erosion /peat blows on the eastern side of England exposed to the North Sea. It may be, as per Rollett and Williams (2020), that the SSEW wind exposure map will be adequate for the ALC system.

Task 2.1.2: Prepare a wind exposure risk map or maps for England and Wales that can identify those areas at high risk from spring, summer and salt laden wind and assign ALC grades according to the limitation imposed. The wind exposure map or maps must be OGL produced on a 50m raster in line with the approach used for the Predictive ALC Maps in Wales and England.

There may be significant variation within the 50m raster cell. The methodology for assigning the limitation in such circumstances must be agreed with Defra.

For both Sub-Tasks, outputs need to reflect actual limitation and extent and will require crop specialist input and validation using any relevant crop yield statistics and recorded exposure limitations from ALC survey data.

Accompanying criteria text must be produced to update the ALC grading criteria on the expectations for an in-field assessment as well a short report to explain how the wind exposure map was produced and grades assigned.

Task 2.2: Frost Risk (*ALC Review, Section 9.4*)
Prepare a frost risk map for England and Wales and assign ALC grades according to the limitation imposed (based on the number of days of spring frost, as part of the climate assessment for land in ALC grades 1 and 2). The frost risk map must be OGL produced on a 50m raster in line with the approach used for the Predictive ALC Maps in Wales and England.

Comparison of ALC grade with and without frost at a sub-set of sites currently ALC Grade 1 or 2. Number and distribution of sites that change ALC grade if spring frost is considered. Does this reflect the situation on the ground?[7]

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[7] Natural England has miscellaneous existing frost risk maps including one for SE England and others prepared by the Met Office to inform the original 1" to 1 mile map sheets (Archive box J280). These could be used as part of a sense check.

There may be significant variation within the 50m raster cell. The methodology for assigning the limitation in such circumstances must be agreed with Defra.

Accompanying criteria text must be produced to update the ALC grading criteria on the expectations for an in-field assessment[8] as well a short report to explain how the frost exposure map was produced and grades assigned.

Task 2.3: Gradient (*ALC Review, Section 10.1*)
ALC criteria text to be updated to include notes on the high risk of erosion on light soil types when the slope gradient is >3°.

Produce a 50m raster layer for slope limitation according to ALC grade for use by surveyors – this may already be available through the Predictive ALC Map production.

Task 2.4: Microrelief (*ALC Review, Section 10.2*)
Task 2.4.1: where the gradient of the land is ≤7° but the land has many depressions or rocky outcrops (that cannot be remedied by normal agricultural operations) then it will be necessary to downgrade the ALC grade to 3b (from 1, 2 or 3a) to reflect the level of hindrance to mechanical operations.

Accompanying criteria text must be produced to update the ALC grading criteria on the expectations for an in-field assessment.

Task 2.4.2: Prepare a microrelief map for England and Wales and assign ALC grades according to the limitation imposed from Task 1.4.1. The microrelief map must be OGL produced on a 50m raster in line with the approach used for the Predictive ALC Maps in Wales and England.

Data may include LIDAR, CIR, AP's, Soils data, OS rock outcrop layers, previous developments, remote sensing/EO data.

There may be significant variation within the 50m raster cell. The methodology for assigning the limitation in such circumstances must be agreed with Defra.
Outputs need to reflect actual limitation and extent and a validation methodology must be outlined and agreed with Defra.

Task 2.5: Flooding (*ALC Review, Section 10.3*)
Task 2.5.1: Rapid in-depth review of the risks related to flooding at different times of the year on crop types[9]. Identify the most suitable data sources flooding frequency, duration and extent. Review the (unpublished) Welsh Government ALC flood risk map and methodology.

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[8] It will be important for an in-field to be made. The likelihood of damaging frost is very dependent on physical barriers to cold air drainage down a valley (e.g elevated roads & rail lines). How this is practically taken account of in a map needs consideration.

[9] (Internal) ALC Instruction Manual includes an assessment of the susceptibility of crops to flooding- see para 5.08-5.14.

Task 2.5.2: consider the practicalities of a simplified approach to grading and agree with Defra, and the findings of Task 1.5.1.

ALC criteria text to be updated to include the revised expectations for an in-field assessment and downgrading where soils of low permeability are present. Soils of low permeability must be agreed with Defra. The assessment criteria should reflect the availability of data to aid the surveyor in grading.

Task 2.5.3: Prepare a flood risk map for England and Wales and assign ALC grades according to the limitation imposed. The flood risk map must be OGL produced on a 50m raster in line with the approach used for the Predictive ALC Maps in Wales and England. A short report must be compiled to explain how the flood risk map was produced, grades assigned and how it should be used.

There may be significant variation within the 50m raster cell. The methodology for assigning the limitation in such circumstances must be agreed with Defra.
For all Sub-Tasks, outputs need to reflect actual limitation and extent, and will require specialist crop and flood input and validation using any relevant crop yield statistics, Welsh Government ALC flood risk map, and recorded limitations from existing ALC survey data.

Task 2.6: Irrigation (*ALC Review, Section 12.3*)
Task 2.6.1: Irrigation is no longer considered in ALC grading and will not be included in future updates to ALC guidance. ALC criteria text to be updated to make this explicit and consider including additional text to explain why, as per the recommendation in Section 12.3.2 of Report SPEP2021/22-02.

Task 2.7: Soil Erosion (*ALC Review, Section 12.4*)
Updating of text relating to erosion. Detailed guidance on the factors that are likely to increase erosion risk. Alternatively, ALC guidance could include links to useful resources such as the Defra runoff and soil erosion risk assessment.

Work Package 3 – Soil Limitations:

Task 3.1: Stoniness (*ALC Review, Section 11.3*)
Contractor to consider the practicalities of a simplified approach to grading and agree with Defra. Should the requirements be kept, the stoniness table will need clarifying as >2cm means all stones >2cm (including >6cm) and >6cm only factors in if more limiting.

Clear in-field guidance will need to be produced. The most accurate method is field sieving, for standalone and drought limitations.

Task 3.2: Chemical Limitations (*ALC Review, Section 11.4*)
Additional guidance on infield assessment and grading is required on how to assess whether the soil PTE concentrations are at a level where they are unlikely to be suitable for growing crops for direct human consumption. Soil PTE limit values included in the Code of Practice

for Agricultural Use 49 of Sewage Sludge (DoE, 1996) should be used as 'trigger values' to initiate further investigation before deciding on a final classification under the ALC system.

Work Package 4 – Interactive Limitations

Task 4.1: Wetness (*ALC Review, Section 12.1*)
Task 4.1.1: Additional text:
- To define "mottles" and some accompanying illustrations. Also, further guidance on the identification of the frequency of mottles noting that the important distinction for ALC purposes is to identify if there are >2% mottles.
- On how to use a Munsell colour chart (i.e., comparing a freshly extracted moist soil sample with standard Munsell soil colour charts in good natural light).
- To include definitions of soil structural types, biopores and soil consistence. Also, confirmation of the soil textures included in the fine to very coarse categories in ALC Figure 5[10] (diagrammatic representation of the combination of structure, texture and consistence which are characteristic of slowly permeable layers).
- To include an assessment of soil consistence forms part of the ALC pedotransfer function for the identification of an SPL but knowledge of soil consistence is assumed rather than described. As a result, it is suggested that a table of soil consistence categories is added to the ALC.

Note: the contractor to recommend where additional text is best placed – in the new ALC Criteria or in the survey handbook

Task 4.1.2: automate the soil wetness assessment e.g. by producing a spreadsheet calculator with user guide including a section on how the calculator functions.

The changes to the climate dataset and any potential modifications to the soil wetness method could result in many grade changes. The contractor will need to factor in the possibility for a feedback loop where changes in data produce anomalies and the contractor is required to go back to first principles to understand what factors are potentially contributing to anomalous results and how this can be resolved.

Professional judgement will still be required to ensure the assessment matches actual land capability; for example, in groundwater situations and/or where the land cannot be adequately drained.

Task 4.1.3: Soil Texture Class (*ALC Review, Section 11.1*)
Approved method needs to be confirmed in guidance to avoid any doubt and ensure consistency of approach. SPEP2018/19-12: ALC Technical Review - Part 1 - PSD, gradient, depth & stoniness provides analysis of texture methods and issues when considering this task.

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[10]
https://webarchive.nationalarchives.gov.uk/ukgwa/20130402151656/http:/archive.defra.gov.uk/foodfarm/landmanage/land-use/documents/alc-guidelines-1988.pdfy

The revised system to stipulate the PSD method and that PSDs are undertaken to confirm topsoil textures (or that robust justification is given as to why PSD not undertaken e.g. if clearly not grade dependant). This task is to also be reflected in Task 8.2.

Task 4.2: Field Capacity Days (*ALC Review, Section 7.7*)
Task 4.2.1: Identify the impact of the proposed changes to the reference climate dataset, on the FCD calculation and determine whether an alternative method for determining FCD is appropriate. Update to MORECS dataset, subject to cost and licencing which the contractor will be expected to advise Defra of. Should MORECS not be selected, the contractor must identify an alternative solution in consultation with Defra.
The relationship between SMD and other climate (rainfall) or location variables (altitude, easting or northing) would be appropriate to update the regression equation for predicting FCD.

Task 4.2.2: Prepare an OGL field capacity layer produced on a 50m raster in line with the approach used for the Predictive ALC Maps in Wales and England.

Task 4.2.3: The changes to the climate dataset, including the FCD dataset will influence final gradings for soil wetness. In addition, the FCD categories / cut-offs used in the soil wetness assessment may need updating. The contractor will need to factor in the possibility for a feedback loop where changes in data produce anomalies and the contractor is required to go back to first principles to understand what factors are potentially contributing to the anomalous results and how this can be resolved.
Statistical and spatial assessment of the impact of new climate data on wetness gradings at an England and Wales level based on an estimation of the grades using 'old' and 'new' climate data.

Assess distribution of change and determine 'uncertainty in the data, e.g., where land that changes grade is interspersed with land that does not change grade or changes that do not fit with field observation.

A subset of samples will be graded by ALC surveyors to confirm that the model grading is representative of field conditions.

Task 4.3: Soil Droughtiness (*ALC Review, Section 12.2*)
Task 4.3.1: Assess the underlying assumptions about when crops realise full leaf cover (due to climate change) and rooting characteristics for crop adjusted available water values and revise as necessary in consultation with Defra.

Task 4.3.2 Moisture deficit (MD) (Rainfall-potential evapotranspiration): Review the equation currently used to calculate moisture deficit.
The precise nature of the relationship is likely to change if the background dataset is updated.

Due to changes in the climate since the ALC was designed, review the underlying assumptions of the current moisture deficit method in relation to the growing season attainment of full crop cover.

Review the text used to describe the MD term to ensure it is easy to follow.
Changes to the moisture deficit equation may result in grade changes. Potentially the grade cut off for moisture balance (droughtiness) may need to be updated.

Task 4.3.3 Potential evapotranspiration: Review the equation used to calculate potential evapotranspiration. Changes to the equation may result in grade changes. The grade cut off for moisture balance (droughtiness) may also need to be amended.
Task 4.3.4: Examine the relationship between MB and crop yield using a more recent dataset to determine if the cut off points for ALC Grades currently in use are still valid and reflect reality on the ground.

Moisture balance: crop adjusted water capacity minus moisture deficit. Winter wheat and potato yields should be compared with calculated MB for a dataset which covers multiple years. Yield data from the same site but in different years with different moisture contents should be included. Also, from sites with different soil types. Both the 'old' and 'new' methods for calculating MB should be used and compared.

Task 4.3.5: Contractor to consider the practicalities of a simplified approach to assessing droughtiness (including Tables 14 & 15[11]) and agree with Defra. **Note**, droughtiness is very sensitive to a range of soil parameters (incl texture, individual soil horizon depths, stone content, subsoil structure) and can be quite dynamic across a single site. Moving away from a crop adjusted element might simplify matter but it is not clear if / how this could be done to produce meaningful 'average' droughtiness criteria.

Task 4.3.6: Propose other automated approaches and deliver or update and validate the existing automated Excel system[12].

Task 4.3.7: Determine the significance of the droughtiness factor in the grading of agricultural land in England and Wales using contemporary weather and crop yield statistics agree.

The ALC system should be reviewed using contemporary weather and crop yield statistics to determine the significance of the droughtiness factor in the grading of agricultural land in England and Wales. Updates to many of the components of this method have been proposed, which could result in changes to the ALC grade according to droughtiness. This is important because droughtiness is one of the main determinants of final ALC grade and as the climate changes it is predicted to become an increasingly important factor in determining ALC grade. To determine the effect of these changes a sub-set of sites from a range of climates, soil textures and soil groups must be graded using the old and new

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[11]

https://webarchive.nationalarchives.gov.uk/ukgwa/20130402151656/http:/archive.defra.gov.uk/foodfarm/landmanage/land-use/documents/alc-guidelines-1988.pdfy
[12] ADAS 2020

methods/datasets. Results must be compared to determine changes to ALC grade for a) droughtiness and b) overall. **Farming adaptations to a changing climate also need to be factored in as it is necessary to understand the impact of increasing doughtiness on land capability.**

Work Package 5 – Climate

Task 5.1: Climatic data methodology and processing (*ALC Review, Section 7*)
Task 5.1.1: Review the reference climatic dataset used for the ALC and update the temperature and rainfall dataset.

The updates to the climate dataset have been described in Table 16 along with the proposed new data sources and validation methods. Note: MD values would change if a different/simplified way of calculating droughtiness was progressed under Task 4.3.
The ALC grade for climate using current (1988 approved) ALC data must be compared with the grade using the new climate data (HadUK-Grid). In this comparison, the climate dataset should be the only parameter that is changed. The overall ALC grade calculated using the old/new climate datasets should be compared. This will ascertain whether climatic conditions determine overall grade less/more frequently than in the past.

Task 5.1.2: Changes could affect the ALC grade for climate, soil wetness or droughtiness.

Statistical and spatial assessment of the impact of new climate data on climate, wetness and droughtiness gradings at an England and Wales level based on an estimation of the grades using 'old' and 'new' climate data.

Assess distribution of change and determine uncertainty in the data, e.g., where land that changes grade is interspersed with land that does not change grade or changes that do not fit with field observations.

A subset of samples will be graded by ALC surveyors to confirm that the model grading is representative of field conditions.

Consider changes from MAFF,1988 datasets (1941-70 & 1961-80) to understand the impact on grading.

Climate reference period 1991-2020.
Benchmark period 1961-1990.
Using the HadUK-Grid

Table 16 of ALC Review:

Table 16. Summary of proposed datasets and sources for updating the ALC climatic parameters

Dataset	Source	Details	Comments
Climate	Met Office HadUK-Grid dataset	Climate variables derived from the network of UK weather stations which have been interpolated to a regular grid. Daily, monthly, annual and long-term average datasets	The dataset includes key UK climate variables at up to 1 km resolution On average, air temperature is available from 540 and rainfall from 4400 stations, respectively. The long-term average (LTA) dataset, which uses climate data averaged over 30 years rather than annual data is of most relevance for the ALC Available for downloading via the Centre for Environmental Data Analysis (CEDA) Data is available under open government licence which allows the information to be used "freely and flexibly with only a few conditions".
Average annual rainfall (AAR) Average summer rainfall (ASR)	Met Office HadUK-Grid	Total precipitation amount over the calendar month, season or year (mm)	Rainfall LTA monthly gridded dataset can be used to calculate AAR or ASR for the most recent 30-year period of 1991-2020
Accumulated temperature January to June (AT0) Accumulated temperature April to September (ATS)	Met Office HadUK-Grid	Daily air temperature records. Maximum and minimum temperatures	A subset of stations can be used to examine the relationship between the mean monthly AT0 and the mean maximum and minimum monthly temperatures (the January to June accumulated temperature is the sum of the monthly totals). The relationship (regression equation) can then be applied to the HadUK-Grid dataset.

			To validate the regression equation, derived estimates of AT0 should subsequently be compared to actual AT0 (for an earlier 30-year period. The method can be repeated for ATS.
Field capacity days	MORECS dataset	Number of days when soil moisture deficit = 0 mm Start of the field capacity period (autumn): SMD <0 mm for ≥5 consecutive days End of field capacity (spring): SMD >0 mm for ≥5 consecutive days.	Data from synoptic weather stations interpolated to a 40 x 40 km grid (approximately 200 grid squares cover the UK). There is probably a cost for using the MORECs data.
Moisture deficit (wheat and potatoes)		July and August soil moisture deficit for wheat and main crop potatoes	It will be necessary to regress the data against summer rainfall and temperature to produce an updated equation for predicting MDW and MDP.

Task 5.2: Climate (AT0/AAR relationship) (*ALC Review, Section 7.3*)

Task 5.2.1: The long-term average (LTA) HadUK-Grid dataset is suggested as the basis for updating the AT0/AAR dataset.

Climate reference period 1991-2020.

Task 5.2.2: To validate the regression equation, derived estimates of AT0 should subsequently be compared to actual AT0 (for an earlier 30-year period)

Task 5.2.4: Updating both the rainfall and temperature ALC datasets will require the regression equations for predicting MDW and MDP to be updated. New soil moisture deficit data can be obtained from MORECS for the most recent 30-year period (1991-2020). It will be necessary to regress the data against summer rainfall and temperature to produce an updated equation for predicting MDW and MDP.

Task 5.2.5: (*ALC Review Section 9.1*): Introduce maximum values for AT0 and minimum values for rainfall so that very warm and dry sites are not classed as Grade 1 for climate and update ALC criteria text.

Task 5.2.6: Review the basis for the current cut-offs for ALC grade by climate according to the curvilinear relationship between AAR and AT0.

Task 5.2.7: Calculate and review whether climatic averages are the best approach for ALC or if probabilistic approaches (like the ANC/Van Orshoven method) should be used.

Task 5.2.7: Report the equation separating the 6 classes for the grade curves. Prepare an OGL shapefile based on the 50m raster approach for grade by overall climate.

Task 5.2.8: Assess likely impact on grading compared with MAFF 1988 grade by climate. Are changes consistent with trends in climate change since MAFF, 1988? If not recommend a solution and agree approach with Defra.

Task 5.3: Climate extremes or episodic events (*ALC Review, Section 8.1*)
Task 5.3.1: Determine the best metric for capturing climatic variation within the ALC (i.e., it is not just the average climatic conditions that are important but the variation around that average).

Task 5.3.2: Investigate how best to incorporate the influence of the probability of extreme events into the ALC methodology (e.g., frequency and severity of extreme events). Establish the methodology that would best capture the impact of weather extremes on agricultural land. Updates to the ALC could include the addition of new parameters (e.g., longest dry spell) or revision to current criteria (e.g., the use of percentiles rather than absolute values).

To assess the effect of this change, the grade according to climate must be assessed based on a probabilistic approach. Determine whether the average climatic conditions are important or the variation around that average. Climate variability metric: how often does a site change ALC grade for climate. The most variable sites could be downgraded for climate compared with sites with a more stable climate. ALC grade for climate could be calculated based on averages (current approach) and compared to grades where sites are downgraded where the climate is very variable. Investigate the addition of new parameters (e.g., longest dry spell or warm spell duration).

Task 5.3.3: Prepare a necessary datasets / spatial shapefiles for England and Wales and assign ALC grades according to the limitation imposed from Task 5.3.2. The output must be OGL and if necessary produced on a 50m raster in line with the approach used for the Predictive ALC Maps in Wales and England.

Necessary accompanying reports / guidance / digital resources must be produced.

Work Package 6 – Testing & Trialling

Any updates to the climate dataset will be far reaching as they will impact not only the climate limitation but also the interactive limitations of soil wetness and droughtiness. This is important because climate, wetness and drought were identified as the most limiting factors at >60% sites by ADAS (2004) and Keay et al. (2014). Consequently, any changes to these parameters are most likely to impact the overall ALC grade.

The contractor will need to factor in the possibility for a feedback loop where changes in one dataset / methodology produce system wide anomalies and requires a return to first principles. The Agricultural Land Classification Technical Review: scoping study | GOV.WALES provides advice on the steps needed in validating outputs. The Contractor will need to factor validation and risk into the work programme and resourcing, and provide a structured and systematic approach to ensure risk is minimised.

Task 6.1: Contractor to demonstrate the review approach and feedback loop at tender. Predictive ALC Maps (for England and Wales), could be used to test and trial the system at scale, as well as re-calculating existing surveys under the new criteria and targeted field work (i.e., new surveys). Testing needs to reflect different soil types in differing climatic zones.

Work Package 7 – Update of Systems

- **Task 7.1:** Incorporate all ALC criteria updates into new document (replacement of the 1988 Blue Book)

- **Task 7.2:** Update the Predictive ALC Maps for England and Wales using the new ALC criteria. The Predictive maps are expected to be useful to test the system at scale and compare grade changes. Linked to WP8, PALC Maps to allow the user to see the grade by limitation and highlight most limiting factor.

- **Task 7.3:** Contractor to consider future proofing options for the ALC system or whether it will have to be updated in c.30 years with a new climate dataset. Option to assess the new system against UKCP18 datasets produced by Welsh government for England and Wales.

Work Package 8 – Implementation Planning & Delivery

- Produce and agree a costed implementation plan with Defra and Welsh Government with contractor to deliver all elements within the plan, including but not limited to:

- ALC Background Document Archive / Repository
- Digital Resources Delivery (e.g., climatic maps, drought calculator, soil colouring, training resources)
  - ○ Maps:
    - ▪ Wind Exposure
    - ▪ Frost Risk
    - ▪ Gradient

- Microrelief
- Flooding
- Drought, Wetness & Climate Calculators

- Resources to help identify soil properties.

- Other resources identified by the contractor to assist in the desk study, survey and reporting of ALC grades, such as a survey spreadsheet or app.

- Contractor to advise on the longevity of digital sources and the need for update, hosting, technical support.

- Surveyor training package (e.g., limited in-person seminars and online training videos / tutorials)
- Update Welsh Government post-1988 surveys[13] to show results under the new criteria and prepare as mini-reports and GIS shapefile.

- Survey handbook and report template. Specification for the presentation of data and data requirements, including lab result. The survey handbook will need to balance assumed base knowledge, with information already contained within the Soil Survey Handbook and what is useful to the user.

- Survey validation guide for national and local government users.

- An assessment of the difference in grading between:

  - ENGLAND - The Provisional ALC Map and the Predictive ALC Map (v2 – delivered under this contract)
  - WALES – The Predictive ALC Map v2 and the Predictive ALC Map v3 (delivered under this contract)

- Short policy brief summarising the changes to the system, the reasons for those changes, the longevity of the system and how it should be used.
- Accompanying Reports – all materials, work packages and subtasks require companying report and user guides where appropriate.
- Translation to Welsh for any materials / metadate identified as being hosted on the Welsh Government Website (e.g., Predictive ALC Map Wales report, ALC report template).

Note: contractor will need to recognise the surveyor base, training and delivery has changed significantly since the 1990s. Resources will need to reflect this in clarity and by not assuming knowledge is already present. The objective is to enable a smooth transition between

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[13] Note this is for Wales only due to report format and issues of scale. Wales has approximately 450 post-1988 surveys to update. All have been scanned and all survey point data is in a geo-located excel spreadsheet.

systems and provide surveyors with all the information necessary to provide consistent, transparent and accurate survey results.

Consideration will also need to be given to the hosting of data and materials – where does this best sit, what is the cost and how are materials future proofed? Note: there may be differing requirements between England and Wales.

Also, alternative methods for describing/measuring soil colour should be considered and if agreed with Defra, incorporated as a delivery output under this Work Package[14]. Any systems may need to be validated, guidance developed and consider issues such as lighting conditions / angle.

All outputs and reports are to be OGL.

Reference Documents
Agricultural Land Classification of England and Wales: Revised criteria for grading the quality of agricultural land - ALC011 (naturalengland.org.uk)
The impact of climate change on the suitability of soils for agriculture as defined by the Agricultural Land Classification - SP1104
Predictive agricultural land classification map: production of version 2 | GOV.WALES
Capacity, suitability and climate programme: 2012 study rerun | GOV.WALES
JRC Areas of Natural Constraint Factsheets
1994 ADAS report
Hard copy ADAS technical reports
Agricultural Land Classification of England & Wales – Instruction Manual March 1992

2. Required skills / experience from the contractor and staff.
Tenderers should refer to the specification and evaluation question E03: Project Team - Expertise, Capability and Experience for details on the skills and experience required for this project.

3. Proposed program of work and payment table (Detailing specific tasks, key milestones, deliverables & completion date where appropriate)

Task no.	Task and deliverable	Completion date	Payment schedule

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[14] Such as the LandPKS App

Tenderers should provide the total fixed cost and a breakdown of costs for each milestone task.
Prices submitted should not include any pricing assumptions and should detail exactly what has been included in the price submitted. Any assumptions should be clarified during the clarification period
4. Risk
Tenderers should refer to the specification and evaluation question E04: Project and Risk Management for relevant information.

2.0   Proposal

2.1   The following document is to be used as a Call-Off template to be sent to all Contractors on a sub-lot for completion and return in accordance with the Call-Off procedures detailed in the Form of Agreement.

Research, Development and Evidence Framework 2
PROPOSAL

Contractor's Name: RSK ADAS Ltd **Call off Reference: RDE745** **Sub-Lot Number: 2.4 – Modelling Toolkits, Informatics and Comparative Life Cycle Assessment Services** **Date: 20th January 2025** ████████████████████████████ ███ ████████████████████████
E01. Understanding of Requirement

E02. Approach and Methodology

E03. Project Team - Expertise, Capability and Experience

Version 5.0
LIT 58468

E04. Project and Risk Management

ately.

E05. Sustainability

- Cont

7. Cost Proposal

███	████████		████	███
█	████████		████	████
█	████████		███	███
Total costs				**£643,043 (+VAT)**

██████████

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3.0   Order Form

3.1   The following document is to be completed by the Contracting Authority and sent to the Contractor for counter signature to form a Call-Off contract.

Research, Development and Evidence Framework 2   **ORDER FORM**
Project Title: The Agricultural Land Classification System Full Technical Review   **Call Off Reference:** RDE745   **Atamis Project Reference:** C28644   **Date:** 09 April 2025

THE Contracting Authority: Department for Environment, Food & Rural Affairs, Seacole Building, 2 Marsham Street, London SW1P 4DF

THE CONTRACTOR: RSK ADAS Limited, Spring Lodge, 172 Chester Road, Helsby, Cheshire WA6 0AR.

This Order Form, when completed and executed by both Parties, forms a Call-Off Contract.

APPLICABLE FRAMEWORK CONTRACT

This Order Form is for the provision of the Call-Off Deliverables and dated 09 April 2025. It's issued under the Research Development & Evidence Framework Agreement reference 30210 for the provision of the Agricultural Land Classification System Full Technical Review.

CALL-OFF SUB-LOT: 2.4 – Modelling Toolkits, Informatics and Comparative Life Cycle Assessment Services

CALL-OFF INCORPORATED TERMS The following documents are incorporated into this Call-Off Contract. Where numbers are missing we are not using those schedules. If the documents conflict, the following order of precedence applies:

1. Defra Framework Terms and Conditions;
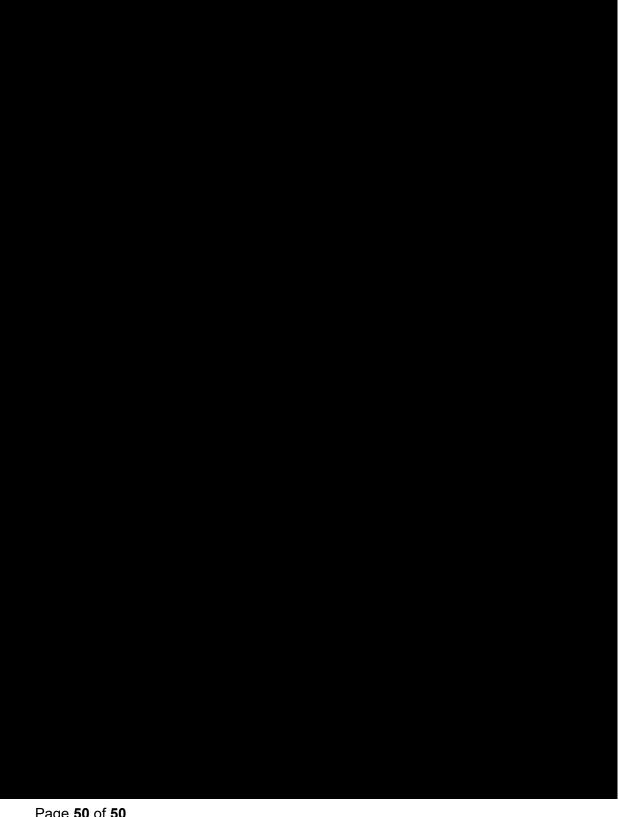2. Request for Proposal;
3. Proposal;

No other Supplier terms are part of the Call-Off Contract. That includes any terms written on the back of, added to this Order Form, or presented at the time of delivery.

CALL-OFF CONTRACT START DATE: 09 April 2025

CALL-OFF CONTRACT EXPIRY DATE: 09 April 2027

CALL-OFF PERIOD: 24 Months - Provision for an additional 3-month extension period at the discretion of the Contracting Authority

DocuSign Signatures: