- *Please note that this specification is DRAFT only and is subject to change before the competition release date.*

Specification for delivery of England Ecosystem Survey Soil field sampling and data collection

1. Project background

The NCEA (Natural Capital & Ecosystem Assessment) Programme

The UK Government has set world-leading ambition on protecting our natural assets, internationally through the Convention of Biodiversity and domestically via the ground-breaking 25 Year Environment Plan. Intrinsically linked to the successful delivery of Net Zero, protecting our environmental services has never been more vital. Achieving these goals is underpinned by the provision of systematic and robust evidence. For the first-time, Defra are developing a programme to deliver up-to-date, England-wide environmental data to allow for agile policy making grounded in the best available evidence – to truly understand where we are and where we need to get to.

NCEA is a transformative programme to understand the extent, condition and change over time of environmental assets across England's land and water environments, supporting the government's ambition to improve the environment within a generation.

The England Ecosystem Survey

An element of the NCEA programme is the **England Ecosystem Survey** (EES) which is an ambitious new method of collecting environmental data. The aim of the EES is to get a true understanding of the condition of England's terrestrial environment and natural capital assets. To achieve this the survey will collect data on attributes of extent condition and connectivity relating to habitats, vegetation and landscape features and landscape character, as well as soil physical and chemical properties and soil and water biota eDNA. It will also collect data to support Natural England's earth observation programme. Change will be assessed through repeat surveys on a five-year cycle.

The basic survey unit is a $1km^2$ area based on Ordnance Survey National Grid squares, or monads. Each year a new sample of monads will be surveyed through a combined sampling approach of randomly selected squares stratified by ITE land classes, and a proportion targeted to increase the likelihood of covering certain habitat, soil and landscape character types. The baseline sample will be established over the first five-year period.

Following a period of method development, piloting and refinement, the first full field survey took place in 2023, aiming to scale this up in 2024.

2. Project Scope and requirements

The contract will run from September 2024 until March 2025. The contract will cover the planning and delivery of soil sampling and assessment and soil classification surveys at targeted areas within a monad. There are up to six soils plots per monad associated with vegetation plots surveyed under a separate contract in the summer months. Four of the vegetation plots will have been randomly

placed, and up to two targeted at priority habitats. Soil samples collected from these plots will be analysed under a separate contract for:

- pH
- Particle size distribution (PSD)
- Organic matter by loss on ignition (LOI)
- Total organic carbon
- Total moisture
- Bulk density
- Available and total phosphate
- Total nitrogen
- Exchangeable cations and cation exchange capacity
- Al, As B, Ba, Ca, Cd, Co, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, P, Pb, S, Sr, Zn, V, Mo, Hg
- eDNA for a range of taxa
- morphological identification of nematodes and mesofauna
- Earthworm counts and identification

In addition, each plot requires a soil classification survey to describe the soil type, as a one-off contextual study. This involves digging a soil pit, soil augering and collecting a soil sample as well as photographing the soil profile.

3. Roles and Responsibilities

Efficient and timely delivery of the field survey and analysis requires clear division of responsibilities and lines of communication. Key requirements are set out here:

Natural England (NE) will:

- Supply monad locations, with suitable survey point locations via recording apps;
- Supply surveyor packs with contact details, utilities, Unexploded Ordnance (UXO), designated site info, HER risk and other required site information;
- Supply and maintain protocols for soils sampling and classification, and app and equipment user guides;
- Provide soil sampling training;
- Maintain a supporting surveyor library, accessible through Sharepoint Online (SPOL);
- Review survey schedules with the lead contractor and plan Quality Assurance (QA) visits;
- Collate QA results/ findings;
- Provide QA feedback – direct to survey teams, general updates to all teams (via contract co-ordinator);
- Receive and review technical queries from survey teams relating to interpretation of protocol or use of data recording apps, where they cannot be answered by lead contractors. Provide and disseminate answers, update FAQs;
- Capture process/ guidance improvements from QA and feedback, for future methods/ protocol review.

The lead contractor will:

- Ensure surveyor availability and manage their deployment to deliver the requirements of the survey;

- Communicate with landowners to agree survey dates for their land at least one month in advance of the proposed visit;
- Provide an initial survey schedule, with named surveyors (at start of contract?) and live information and updates to NE throughout the survey season;
- Facilitate co-ordinated QA visits;
- Capture queries from field teams via mailbox, surveyor chat groups, and log on NE EES SPOL;
- Triage queries and provide answers where they can be found from existing protocols and guidance or responses to similar questions, point survey teams to FAQs etc;
- Check answers to new queries, from NE contacts and queries log, and disseminate to surveyors;
- Ensure surveyors are aware of any protocol and guidance updates;
- Ensure that soil samples are kept in cool conditions during sampling and shipping to the laboratory:
- Ensure surveyors provide correct soil sample supporting information to labs;
- Ensure labs are informed of sample flow and any issues.

Contract field surveyors will:

- Access Survey protocols/ guides/ surveyor library via NE SPOL;
- Follow site-specific information in the survey packs and raise any queries regarding monad/square viability arising from pre-survey checks with the lead contractor;
- Capture survey data on the relevant field recording apps and upload to servers;
- Raise any issues and queries and suggestions via an EES contract mailbox/ chat groups;
- Report issues affecting operation of the data collection apps, field technology etc and provide error logs and any supporting information to NE;
- Document and manage soil sample posting, with supporting sample information;
- Inform labs and lead contractor of any problems with sample flow;
- Check for updates on methods/ guidance etc.

4. Tasks and Deliverables

The aim for 2024-25 is to carry out the surveys in 500 monads. The lead contractor will need to secure sufficient surveyor resource with the necessary skills to deliver both soil sampling and assessment and soil classification survey, to quality standards. It is assumed that there will be on average four soils plot per monad, which has informed survey timing estimates. There could however be up to six plots per monad. It is recommended that for soil sampling and assessment surveyors work in pairs, to share tasks and meet health and safety requirements. Soil classification requires specialist soils knowledge and more likely to be undertaken by lone workers. Based on experience from 2023 surveys take, on average, per monad in the field:

- Soil sampling and assessment – 8 surveyor days, i.e. 4 days per pair
- Soil classification - 3 days for one surveyor

Travel time and contingency for any issues that arise mean that a survey pair is likely to achieve one full vegetation and landscape or soil sampling monad survey per working week on average.

4.1 Surveyor Set-up

The lead contractor will ensure that each surveyor is supplied with an iPad for data collection, with appropriate software. Each surveyor will require an Arc GIS Online (AGOL) account to be set up before training and commencement of surveys. NE will be supplied with a list of surveyors and email

addresses to set up accounts and attribute licences. Surveyors should have corporate rather than personal email addresses for use with accounts and NE share point access permissions.

Surveyors should familiarise themselves with the data collection apps and survey resources before attending the formal training. The main data collection apps are Esri products Survey 123 and Fieldmaps for which training will be given and supporting guidance provided. Surveyors will also need to use geolocation device Juniper Systems GNS3 receiver in conjunction with data collection apps to locate and capture survey points.

4.2 Access Permissions

NE will supply contact details for all land where permission has been obtained to survey in each monad in the survey information packs, and make them available at least 6 weeks before the scheduled survey. The lead contractor will contact landowners a minimum of one month before the proposed survey date, taking account of any site-specific information that will affect this, explaining the purpose of the visit and checking specific access arrangement. The lead contractor should prepare a checklist of points to cover when making contact with owners, and ensure all communications are tracked and any updated details and access information is captured in the survey information packs and effectively and safely shared with teams accessing the site for other elements of the survey. It is important to note that soil sampling visits will almost always be preceded by vegetation and landscape surveys and surveyors will need to take heed of any additional access information provided or points to note recorded from that visit. The visit date should align with the identified survey schedule, and any changes arising from the landowner response should immediately be made to the survey planner, to inform QA planning.

NE will supply the appropriate data licences covering the use of personal data for the purposes of EES, to be signed by lead and sub-contractors. Privacy notices explaining the use of personal data will be supplied to all landowners who's land is covered by the survey.

4.3 Training

The lead contractor will be responsible for organising and co-ordinating surveyor training, ensuring training venues (suitable classrooms and field areas) are agreed with NE and booked. Typically training will need to be carried out in the month preceding the commencement of the surveys.

NE will provide content and deliver technical training, through a combination of preparatory online sessions (up to 3) and multi-day field-based training (4 days for soil sampling and assessment survey; 2 days soils classification survey). NE reserve the right to identify additional required training. The lead contractor will agree a training schedule with NE and assure surveyors attend the required training.

If new surveyors are recruited during the survey season, lead contractor will have to arrange for the training to be delivered by NE prior to surveys.

Only personnel trained by NE will be permitted to carry out the survey. The exception is a third person (or a second person for the classification surveys) helping on remote sites. This additional person will not carry out sampling and assessment or classification tasks, respectively but only assist with carrying equipment and soil samples, and manual handling.

Survey personnel must be trained in: outdoor first aid, avoiding danger from underground utilities – use of cable avoidance tools (CAT and Genny), UXO awareness, and manual handling.

4.4. Fieldwork Delivery

The lead contractor will be responsible for ensuring each survey element is carried out in the full sample of monads, in the appropriate survey window. Surveys will take place in accordance with the survey schedule agreed with NE before surveys start.

The lead contractor will be responsible that the surveys are carried out safely, including preparation of risk assessment, carrying out required safety briefing, providing appropriate Personal Protective Equipment (PPE) and other safety equipment. The lead contractor will also be responsible for ensuring that contractors working on remote site have got means of calling emergency services, e.g. by providing staff with satellite trackers.

4.4.1 Soil Sampling and Assessment Survey

Field survey will take place during the period of September – February inclusive. Surveys will be carried out in accordance with the method statement in the EES Soil Sampling and Assessment Field Manual, version 2.0 as attached as Appendix 3. This covers the detailed survey requirements, including:

- Pre-survey preparation, including familiarisation with site information and agreeing access;
- Identifying and locating sampling points, with reference to online surveyor planning maps;
- Types of soil samples and detailed sampling method;
- Carrying out earthworm counts and Visual Assessment of Soil Structure (VESS);
- Survey workflow;
- Decisions on moving or abandoning a sample;
- Packaging and posting of soil samples;
- Health and Safety;
- Biosecurity.

4.4.2 Soil Classification Survey

Field survey can take place throughout the year as conditions allow. Surveys will be carried out in accordance with the method statement in the EES Soil Classification Survey Field Manual, version 1.2, as attached as Appendix 2. This covers the detailed survey requirements, including:

- Pre-survey preparation, including familiarisation with site information and agreeing access;
- Identifying and locating sampling points, with reference to online surveyor planning maps;
- Assessing plot suitability;
- Field description of soil profiles and sampling;
- Survey workflow;
- Decisions on moving or abandoning a sample;
- Packaging and positing of soil samples;
- Health and Safety;
- Biosecurity.

4.5 Equipment

The surveys require specific and dedicated equipment, particularly for soil sampling and assessment, as identified in the field survey protocols. The lead contractor will be responsible for distributing equipment held by NE to field teams, and for purchasing of new and replacement equipment as instructed by NE. The cost of equipment will be covered by the contract. Equipment including consumables should be supplied to surveyors at or before the training to ensure surveys can start as soon as possible after training.

An inventory and tracking log will be maintained and serial numbers of high value items such as iPads and Geolocation devices recorded. The lead contractor will organise repair or replacement of failed equipment under warranty, or purchase of replacements on agreement with NE. It will also be necessary to purchase and distribute consumables such as sample packaging ensuring field teams are kept supplied.

At the end of the contract the lead contractor will arrange transfer of equipment to NE.

5. Project Management and Co-ordination

5.1 Project Management

This is a large and multi-faceted project requiring dedicated project management resource. Lead contractor project managers will need to work closely with the NE Contract Manager, Project Manager, Principal Specialist (technical lead) and soil leads. Clear lines of communication will need to be established, with regular reporting. Key requirements of the lead contractor are:

- Dedicated Project Management resource;
- A clear project management plan in an agreed format with roles and responsibilities of contract staff, RAID log etc (*suggest 2 months before field survey starts);*
- Shared project space for meeting notes, recordings etc and project management tools;
- Weekly progress reporting, with risk and issues identification and tracking;
- Clear escalation routes;
- Deputisation to cover periods of leave or other absence;
- Supply and tracking of survey equipment.

An in-person Project Initiation meeting including a presentation on the lead contractor's understanding of the methodology and how they intend to deliver the project will be held as soon as possible and at a mutually agreed date following contract award.

The lead contractor will schedule weekly project meetings for the first 12 weeks of the project. Subject to all project milestones being 'on track' and the NE Project Manager confirming they are satisfied that all risks and issues are being managed to their satisfaction, NE Project Manager may, under their discretion, reduce the frequency of project meetings to fortnightly. The project meetings will discuss actions from last meeting; project progress against milestones; risks and issues; payment schedule and any other business as required.

All parties to this agreement are responsible for raising risks and issues as they arise. Risks and issue should be raised via email to the NE Project Manager as soon as they arise, and then, if necessary, followed up with a meeting.

The lead contractor will convene additional project meetings on an ad-hoc basis as required, should issues will impact on project delivery, cause a risk of project delays, or other issues that require a more rapid response outside the scheduled meeting timetable.

Interim and final reports will be prepared, with scope to be agreed by NE in advance. The interim report will review progress, identify any impacts on delivery and data quality as well as recommendations for improvements. The final report will include recommendations to improve methods and efficiency over future survey rounds. Draft reports should be accompanied by a meeting or workshop to discuss findings and recommendations before final versions are produced.

5.2 Survey Co-ordination

Effective and pro-active survey co-ordination is central to efficient survey delivery, contributing to surveyor well-being and minimising reputational risk. Key requirements are:

- Dedicated survey co-ordination resource and points of contact;
- Production of a provisional survey schedule fully evidenced by available resource, survey timing assumptions and allocation by sub-contractor groups, at least one month before the first survey. This will take account of any timing restrictions imposed by site designations or features, or requested by the owner; agree any changes to the schedule with NE at the earliest possible date;
- NE will supply monad and plot location details as early as possible and at least two months before the start of the survey;
- Establishment of an effective live shared survey tracking system to aid survey co-ordination, communication and progress reporting;
- Timely allocation of monads to surveyors to allow planning and timely contact of landowners and interested parties;
- Ensure surveyors update the survey tracking sheet within one day of a change to survey status;
- Ensure surveyors synchronise and upload data in a timely manner (e.g. geolocation data is to be synchronised daily);
- Ensure site access information is passed between surveyor teams carrying out the different surveys, and visits are co-ordinated to minimise landowner contact as far as possible;
- Ensure surveyors respond to request for information and feedback to NE and co-ordinate responses;
- Facilitate joint and follow up QA visits by NE surveyors through timely scheduling, to allow NE to have a provisional QA delivery plan at least 2 weeks before the start of the survey.

5.3 Survey Communications

The lead contractor will be responsible for managing the flow of information between NE and field surveyors. A communication plan will be developed and agreed before field survey commences, reflecting the roles and responsibilities set out in section 3. The lead contractor will triage surveyor questions for example to ensure urgent field issues are dealt with promptly and passed to NE staff where necessary. Where information exists, surveyors are guided to relevant protocols or FAQ documents, or captured in issues log where further information is needed, or answers are not immediately available. Communication routes should be identified using appropriate tools such as Teams or Whatsapp chat groups, shared folders on SPOL, or alternative suitable and secure means.

5.4 Quality management

The lead contractor will ensure that surveyors have the necessary skills and experience relevant to the surveys being undertaken, evidenced through CVs. Soil classification surveys require expert knowledge of English soil types and experience of describing soil profiles following the *Soil Survey Field Handbook* (Hodgson, 2022).

NE will undertake QA visits to check aspects of adherence to protocols and carry out repeat measurements where this is practical and appropriate. The lead contractor will ensure any findings communicated by NE are communicated to specific teams, or more widely where general issues are found, and that effective corrective actions are taken.

Laboratories will be monitoring quality of samples arriving and reporting issues to the lead contractor or NE. The lead contractor will we responsible for making sure that appropriate corrective actions are taken by the survey team(s). The lead contractor will do so by checking with the survey team whether the protocol was followed within one working day of being notified of the issue. The lead contractor will send reminders to other survey teams within a week to prevent future occurrences of non-conformances.

Where there is evidence of non-conformance with the survey protocols, either from QA visits by NE or issues identified by the laboratories, payment for the survey affected by these non-conformances will not be made. Subject to agreement by NE, in cases of non-conformance the contractor may carry out repeat surveys at their own expense.

5.5 Health and Safely

Surveying can involve navigating over open countryside carrying heavy equipment (up to circa 20Kg in the case of soil surveys). It may also take place during periods of poor weather conditions and poor visibility.

You should demonstrate that you have robust health and safety procedures in place for employees and sub-contractors, including:

- procedures for work on remote sites;
- risk assessments;
- up-to-date biosecurity measures.

All surveyors are expected to be familiar with their site risk assessments and carry a copy with when surveying. Surveyors should be prepared to produce it if asked. Surveyors will be expected to carry out dynamic risk assessments and are empowered to stop a survey or task that puts anyone at significant risk. Accidents and near hits will be reported to NE through an agreed process. A reporting form is available in the Surveyor Library.

The specifics of soil sampling and classification requires that surveyors will have undergone training in manual handling, detection of underground utilities and UXO awareness (see section 4.3).

NE may stop the surveys by survey teams who carry out surveys in an unsafe way.

5.6 Biosecurity

The EES soil survey is considered a high-risk activity because of the many different sites visited and likelihood of spread of harmful species between them. This could happen due to transfer of soil, plant material, and other debris. Cross-contamination between the plots can also influence the results of laboratory soil analysis. DNA based methods used to assess soil biodiversity are especially sensitive to this. All surveyors will be required to follow the procedures set out in the Soil sampling and soil classification field protocols (appendices 2 and 3).

6 Reporting and milestones

Delivery milestone	**Deadline**	**Comments**
Contract starts	September 24	
Project Inception meeting (plan agreed, resources in place, schedule & comms plan agreed)		
Training delivered soil sampling and assessment		
Training delivered soil classification		
Monad Tranche 1: 20% of Monads Surveyed & Assessed		
Monad Tranche 1: 20% of Monads Classified		
Monad Tranche 2: 40% of Monads Surveyed & Assessed		
Monad Tranche 2: 40% of Monads Classified		
Monad Tranche 3: 60% of Monads Surveyed & Assessed		
Monad Tranche 3: 60% of Monads Classified		
50% Lab samples processed		
Interim report & workshop (Soils Survey & Sampling)		
Interim report & workshop (Soils Classification)		
Monad Tranche 4: 80% of Monads Surveyed & Assessed		
Monad Tranche 4: 80% of Monads Classified		
Monad Tranche 5: 100% of Monads Surveyed & Assessed		
Monad Tranche 5: 100% of Monads Classified		
100% Lab samples processed		
Final report		

Appendices

1. **Soil survey and assessment protocol**

2. **Soil classification protocol**