**Penwith groundwater Ph specification**

March 2023

**About Natural England**

Natural England is the government’s advisor on the natural environment. We provide practical advice, grounded in science, on how best to safeguard England’s natural wealth for the benefit of everyone.

Our remit is to ensure sustainable stewardship of the land and sea so that people and nature can thrive. It is our responsibility to see that England’s rich natural environment can adapt and survive intact for future generations to enjoy.

**Background**

Natural England is in the process of designating the Penwith Moors in Cornwall as a Site of Special Scientific Interest (SSSI). The site comprises 3153ha and is made up of a mixture of semi-natural habitats including heathland and valley mires. The site boundary also includes part of the hydrological catchments of the valley mires under agricultural land to allow for the protection of the water supplying the mire features.

The mires are predominantly fed by acidic groundwater derived from the Land’s End granite pluton. The mires are considered to be in unfavourable condition due to a variety of pressures including nutrient enrichment from inflowing waters with elevated N and P concentrations. It is Natural England’s aspiration to restore the features to a favourable condition by establishing near-natural hydrological function in the mires and the notified parts of their catchments.

Natural England is currently engaging with farmers around identifying and controlling potentially damaging operations within the SSSI to prevent any further damage to the mires, and to restore near-natural hydrological and chemical conditions. Current practice includes the application of farmyard manure, slurry, artificial fertilisers and liming agents to the soil on land in the catchment of the mires to increase crop productivity. Natural England understands that the principal liming agent used is locally won sea sand.

There is a concern that application of liming agents applied to the soil within the catchment could result in a change to the groundwater pH that ultimately supports the mire features. We therefore require an understanding of the impact of liming on groundwater chemistry and pH to know if, and under what conditions, we can consent ongoing application.

**Scope**

The purpose of this project is to understand the impact of soil liming on the natural background groundwater chemistry with a particular focus on pH at local and aquifer scale. The aim is to understand:

* if current practice is having an impact on groundwater pH,
* the scale of the impact,
* whether there is a level of application that has minimal or no impact on groundwater pH, and
* whether there are conditions/mitigation that can placed on lime application to reduce its impact on groundwater pH

in order to inform future consenting decisions, it is envisaged that this can be done through the application of hydrogeochemical models (e.g. Phreeqc). Alternative suitable methods for undertaking the assessment can also be proposed as part of the tender.

**Work requirements**

The contractor is required to:

* Undertake a literature review to assess the current state of evidence for the impacts of liming on groundwater chemistry and pH;
* Undertake an assessment of the impact of soil liming on the pH of groundwater feeding the Penwith Moors mires; and
* Establish if there is an acceptable amount of liming agent application that has minimal or no impact on groundwater pH.

It is anticipated that hydrogeochemical modelling can be used to complete this assessment. However, the contractor should include details of their proposed methodology in their response to this tender.

**Outputs**

A brief report shall be provided in Natural England style ([Link to Guidance](http://nepubprod.appspot.com/publication/5790636781600768?_sm_au_=iVVN6fjjL7Z2jdnVcf4HfK3t7C6f4)) detailing:

* The methodology for undertaking and outcomes of the literature review;
* The methodology for the assessment, including any assumptions and limitations;
* The outcomes of the assessment, including the impact of current liming practices and acceptable levels of liming in the future; and
* Any recommendations for further work.

**Contract management and deadline**

A start up meeting between the NE team and the supplier will be held end of March/start of April. There will be weekly teleconferences thereafter.

We are seeking initial outputs as soon as deliverable and would welcome discussion on this. Ideally a draft digital report would be received by April 30 2023.

A final report and wash up meeting will also be required.

**Sustainability**

Please provide a copy of your environmental policy and any environmental accreditation schemes such as ISO 14001 or EMAS which you have been awarded or are working towards.

**Supporting Documentation**

Please provide the following as part of your quotation:

• Pen portraits of proposed key personnel.

**Quote Format**

Please specify the number of days work anticipated to complete the contract and provide a daily rate. Please ensure any associated expenses are also set out.

**Quote & Contract Timescales**

Request for quote w/c 27/03/2023

Contract Award & Decline w/c03/04/2023

Contract Completion TBC – 2/c 24/04/2023

**Key Contacts**

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