**Future Opportunity Notice – for publication in Contracts Finder**

**Hertfordshire Chalk Groundwater Model Update 2022-2025**

This future opportunity notice is published in order to highlight this project (Phase 1) to the market and allow potential bidders time to allocate resources for tendering purposes. The Agency would also like to highlight future opportunities which are related to this project. This notice does not commit the Agency to proceeding beyond this point and the Agency reserves the right to amend and adapt the requirements outlined below.

**Introduction**

The Hertfordshire Chalk Groundwater Model (HCGM) was built by Mott MacDonald between 2017 and 2019. The focus of the HCGM build was to join three existing groundwater models; Vale of St Albans (VSA), Rib-Ash-Stort (RAS) and South West Chilterns (SWC), which covered the area into one single model. Additional input from the Cam, Bedford Ouse (CBO) groundwater model was used where the newly defined boundary of the HCGM extended into the CBO model area. The model is currently used for groundwater management for surface water catchments in the Agency’s Hertfordshire and North London (HNL) and Thames areas. Surface water catchments for the Cambridgeshire and Bedfordshire (CAMBED) Area are assessed using the CBO model, which at the time of writing runs up to March 2020.

The objective of this model merger was to overcome the difficulties in assessing the impact of abstractions where such abstractions were located close to model boundaries. Other exploratory work considered in the model build included consideration of how to represent the chalk as a layered system. Overall, in areas where the foundation models overlap and model parameters needed to be merged, the VSA model was used for model parameters in preference to the RAS model, which in turn was given a priority over the CBO model. No further works have been carried out on the structure of the model since its delivery in 2019.

**Objective**

The general objective of this project, which is currently in Phase 1 (this current financial year) is to further update the existing groundwater model that will significantly improve the Environment Agency’s ability to make abstraction licensing decisions on a sound scientific basis and, in doing so, protect and/or enhance sensitive groundwater-dependent chalk streams and ecosystems supported by the Chalk aquifer. The model represents a number of Chalk streams that are situated in the Wye, Colne and Lee catchments. These catchments have been previously assessed to suffer from large scale over abstraction through the Catchment Abstraction Management Strategy (CAMS) methodology. This area has a high level of public interest and challenge to existing abstraction management (and management tools) particularly in relation to the protection of Chalk Streams. Other pressures include water quality issues such as Bromate contamination and large scale infrastructure projects such as High Speed Rail 2.

The phase 1 ITT is due to be published in July 2021 and the project must be completed within a 15 month period.

**Overview of expected Project Phases 2 -4**

Built upon Project Phase 1, the Agency envisages a long-term phase-wise upgrading approach, subject to future funding. The future phases will be tendered as separate opportunities. The anticipated tasks for Phases 2-4 are listed in the following:

**Phase 2: Formulation of Revised Conceptual Model (Year 2)**

This phase will refresh the existing foundation conceptual models and merge them into a single conceptual model (Phase 2). This will then support proposals for further development of the model in Phase 3. Phase 2 will likely involve the following tasks:

• Merger of existing foundation conceptual models (Southwest Chilterns, Vale of St. Albans, Lee Chalk Model) in to one single conceptual model

• Collation of new relevant datasets

• Updated Literature Review

• Initial Assessment of Merged Model Conceptual Model Uncertainty

• Topography review

• Mains and sewage leakage and surcharging Analysis

• Groundwater contouring and groundwater catchment delineation

• Bypass recharge review

• Review of influence of superficial deposits, and of unsaturated zone processes

• Review of recharge model parameters

• Geological Model Development

• Flowing and Artesian Features Analysis

• Update of Aquifer Properties and Karstic Features

• Review of Evidence for Hydrogeological Layering

• Review of Impacts of Abstraction Investigations and Changes

• Update of conceptual model water balance

• Review of model boundary conditions

• Update of surface water/groundwater conceptual Model

• Proposals for development and refinement of numerical model in MODFLOW 6

• Formulation of Phase 2 Report

**Phase 3: Development and Refinement of the Historical Model in MODFLOW 6 (Year 3)**

The main focus under Phase 3 will be the conversion of Modflow96 code to the latest Modflow6 modelling code, and the refinement of the updated conceptual model, based on the outcome and recommendations from Phase 2. Phase 3 will likely include the following tasks:

• Construction of MODFLOW 6 Model

• Model Refinement

• Sensitivity Analysis

• Re-run of Standard Scenarios

• NGMS Configuration (MODFLOW 6)

• Formulation of Phase 3 Report

**Phase 4: Training and User Support (Year 4)**

Once the MODFLOW 6 model has been completed in Phase 3, a period of training and model support will need to be provided. We envisage that both Phases 3 and 4 will be contracted to one Supplier. The Phase 4 tasks will likely include:

• Compilation of a User Manual

• Provision of a Model Training Course

• Provision of Model Support

**Specialist Skills**

Tenders will be assessed to ensure the chosen Supplier has all the appropriate skills and expertise to successfully execute the project. It is critical that bidders are competent in developing regional-scale numerical groundwater modelling using any of these codes (SWAcMOD, 4R, 4R6, MODFLOW-96 and MODFLOW6). Proven experience in the Chalk aquifer in England and familiarity with relevant EA guidance for water resources management is essential.

**Timescales**

It is anticipated that, subject to funding approval, the Phase 2 project will start in the 2022/23 financial year. The Agency is aiming to publish the full ITT for Phase 2 in July 2022.

If you have any questions regarding this opportunity, please contact Léonie Cormac at leonie.cormac@defra.gov.uk