NIA Project Registration and PEA Document

Notes on Completion: Please refer to the **NIA Governance Document** to assist in the completion of this form. Please use the default font (Calibri font size 10) in your submission. Please ensure all content is contained within the boundaries of the text areas. The full-completed submission should not exceed 6 pages in total.

Project Registration

Project Title	Project Reference
Hyperspectral Imaging	**ENWL 030**

Funding Licensee(s)	Project Start Date	Project Duration
ENW	Jan 2022	18 months

Nominated Project Contact(s)	Project Budget
InnovationTeam@enwl.co.uk	£275,000

Problem(s)

Until now utility companies have come under an exemption in the regulations around the classification of excavated waste from utilities installation and repair. This exemption comes to an end in June 2022, and following a transition period it will be necessary to classify spoil and process any contaminated/hazardous material in line with environmental regulations.

Method(s)

Phase One

Following review of related prior work, this will involve the identification of appropriate, commercially available hyperspectral camera suitable for identification of chemicals of interest (hazardous contaminants) within soil, e.g. with spectral range including key characteristic features.

This will then progress to the identification and development of processing techniques to identify and quantify contaminants. Creation of necessary code to acquire data from hyperspectral camera, process data, and sentence imaged soil. Phase One will conclude with experimental trials to demonstrate the efficacy of the system and to train any appropriate machine learning for predictive analysis.

Phase Two

Design and development of the most cost-effective solution for the deployment of the camera and system in line with customer requirements.

Scope

This project will consist of two phases, the first will be a development phase were testing is carried out to demonstrate the capability of the device. This will be followed by a series of field tests to confirm suitability for use in real world conditions

Objective(s)

Trial the use of hyperspectral imaging for detecting and classifying contaminants in spoil.
Demonstrate the ability to utilise this technology under field conditions

Success Criteria

Successfully create a prototype device that demonstrates the viability of using hyperspectral imaging on site to detect and identify spoil contaminants

Technology Readiness Level at Start	Technology Readiness Level at Completion
TRL5	TRL8

Project Partners and External Funding

Potential for New Learning

If successful, the project will demonstrate the viability of hyperspectral imaging for identifying contaminants in spoil under field conditions

Scale of Project

The project will initially take the form of laboratory testing and if successful move to field trials of a prototype device

Geographical Area

North West England

Revenue Allowed for in the RIIO Settlement

£0

Indicative Total NIA Project Expenditure

£250,000

Project Eligibility Assessment

Specific Requirements 1

1a. A NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

A specific piece of new (i.e. unproven in GB, or where a Method has been trialled outside GB the Network Licensee must justify repeating it as part of a Project) equipment (including control and communications systems and software)	☒

A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)	☐
A specific novel operational practice directly related to the operation of the Network Licensees System	☐
A specific novel commercial arrangement	☐

Specific Requirements 2

2a. Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees ☒

Please answer one of the following:

i) Please explain how the learning that will be generated could be used by relevant Network Licenses.

The removal of the exemption around spoil affects all utilities, the outcome of the project would be a design for a device which could then be made commercially available to help meet this challenge

ii) Please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the Project.

This project will address the reduce environmental impact objective which sits in our Optimised Assets and Practices theme

Is the default IPR position being applied?

Yes	☒
No	☐

If no, please answer i, ii, iii before continuing:

i) Demonstrate how the learning from the Project can be successfully disseminated to Network Licensees and other interested parties

ii) Describe how any potential constraints or costs caused, or resulting from, the imposed IPR arrangements

iii) Justify why the proposed IPR arrangements provide value for money for customers

2b. Has the Potential to Deliver Net Financial Benefits to Customers ☒

Please provide an estimate of the saving if the Problem is solved.

Currently to test spoil for contaminants requires transporting it to a specialist laboratory at a cost of £230 per sample. Currently ENW carries out on average ~10 jobs per day that require excavations. If the spoils at 50% of these can be shown to be clear of contaminants on site that leads to a saving of of ~£345k per annum

Please provide a calculation of the expected financial benefits of a Development or Demonstration Project (not required for Research Projects). (Base Cost – Method Cost, Against Agreed Baseline).

£230 x 5 jobs per day x 300 working days per year

Please provide an estimate of how replicable the Method is across GB in terms of the number of sites, the sort of site the Method could be applied to, or the percentage of the Network Licensees system where it could be rolled-out.

All DNOs will be facing this issue. Should the prototype prove successful the MTC will work with industry to translate this into a commercially available device

Please provide an outline of the costs of rolling out the Method across GB.

The device would be commercially available should the prototype prove successful. Part of the project is to ensure that the potential price point is acceptable to DNOs

2c. Does Not Lead to Unnecessary Duplication ☒

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

A search of the ENA Smarter Networks portal does not indicate any similar projects have been carried out

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

Additional Governance Requirements
The project is innovative (ie not business as usual) and has an unproven business case where the risk warrants a limited Research, Development or Demonstration Project to demonstrate its effectiveness ☒

(i) Please identify why the project is innovative and has not been tried before.

Previously the spoil from our excavations was covered by an exemption when under a certain volume. This exemption has now ended bringing an additional cost into the disposal of this spoil

(ii) Please identify why the Network Licensee will not fund such a Project as part of its business as usual activities

This is a research project into the viability of the technology to accurately detect the contaminants. It will also look to see if it's possible to miniaturise the device

iii) Please identify why the Project can only be undertaken with the support of the NIA, including reference to the specific risks (eg commercial, technical, operational or regulatory) associated with the Project

This is an R&D project, looking to test the technology in a laboratory setting initially to prove the concept before moving to field trials.

Has been approved by senior member of staff ☒

Additional Registration Information

Short Name

Hyperspectral Imaging

Introduction

Until now utility companies have come under an exemption in the regulations around the classification of excavated waste from utilities installation and repair. This exemption comes to an end in June 2022, and following a transition period it will be necessary to classify spoil and process any contaminated/hazardous material in line with environmental regulations.

This project will look to prove that existing hyperspectral imaging technology can be used to detect contaminants in spoil under laboratory conditions at the levels needed to meet the standard. Once this has been completed the project will look to develop a prototype, handheld device suitable for use on site and carry out field trials.

Benefits

By demonstrating that a handheld device can accurately detect the presence of contaminants in spoil on site the necessity laboratory test, including the transportation costs, can be removed.

Technologies (Please Select one of the following)

Active Network Management	☐
Asset Management	☐
Carbon Emission Reduction Technologies	☐
Commercial	☐
Comms & IT	☐

Community Schemes ☐

Condition Monitoring ☐

Conductors ☐

Control Systems ☐

Cyber Security ☐

Demand Response ☐

Demand Side Management ☐

Distributed Generation ☐

Electric Vehicles ☐

Energy Storage ☐

Energy Storage and Demand Response ☐

Environmental ☒

Fault Current ☐

Fault Level ☐

Fault Management ☐

Harmonics ☐

Health & Safety ☐

Heat Pumps ☐

High Voltage Technology ☐

HVDC ☐

Low Carbon Generation ☐

LV & 11kV Networks ☐

Maintenance & Inspection ☐

Measurement ☐

Meshed Networks ☐

Modelling ☐

Network Automation ☐

Network Monitoring ☐

Offshore Transmission ☐

Overhead Lines ☐

Photovoltaics ☐

Pre-Heat ☐

Protection ☐

Resilience ☐

Stakeholder Engagement ☐

Substation Monitoring ☐

Substations ☐

System Security ☐

Transformers ☐

Voltage Control ☐

Gas Distribution Networks ☐

Gas Transmission Networks ☐