Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Dec 2015

Project Reference Number

NIA_WWU_029

Project Registration

Project Title

Rapid Steel Pipe Cutter

Project Reference Number

NIA_WWU_029

Project Licensee(s)

Wales & West Utilities

Project Start

December 2015

Project Duration

0 years and 11 months

Nominated Project Contact(s)

Paul Breakey - Technical Engineering Manager. Contact on : Paul.Breakey@wwutilities.co.uk

Project Budget

£73,333.00

Summary

This project will design and develop a prototype tool that will be tested thoroughly through onsite trials & further development, specifically:

- Design and develop a cutter to allow the removal of a window from a steel main that has been inserted with PE. It is assumed that the existing ductile window cutter design will be used as a starting point with a focus on two key areas for modification; the air powered motor and blade system;
- Develop a working prototype and carry out off site testing in the order of 20-30 operations;
- Carry out at least 10 onsite trials to review the solution with field operatives; and
- Recommend any necessary modifications

This tool needs to be simple and safe to use and be able to work within a typical service excavation without requiring additional cost excavating or damaging other utility apparatus.

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

Wales & West Utilities (we/our) replace approximately 90% of their network with mains insertion techniques. By using this technique, we are able to replace old metal gas pipes faster, reducing the time our customers are off gas and helping to reduce travel disruption from roadworks.

After the new main is inserted and laid we need to transfer our customer's individual services from the old pipe to the new one. This requires us to expose and access the newly inserted plastic pipe. Tooling is available for us to expose and access the new pipe in cast iron and ductile iron pipelines however we do not have an approved tool for cutting a window that allows a connection, in steel

pipes.

Our stakeholders have told us that works that are completed as quickly as possible with the minimum of disruption are important to them, they particularly value our adoption of techniques to replace the gas main that allows us to limit the number and impact of holes we have to dig. The absence of a tool for cutting steel therefore reduces the ability to meet these stakeholder needs in steel replacement works.

The replacement of steel pipelines using equipment currently available creates operational inefficiencies such as:
- Increased time taken to replace our old metal gas pipes;
- Require larger/deeper excavations; and
- Increased cost of delivery compared to the replacement of cast iron pipes where the main insertion technique can be used

Therefore, we have identified a need to develop a tool to effectively cut steel mains up to a thickness of 9mm.

Method(s)

The project will be delivered through the Methods of development and demonstration.

Stage 1 – Transfer Knowledge (Development)
The completed project, NIA_WWU_013, developed a cutter for ductile iron mains. The first stage therefore is to establish the elements of this work which can be transferred in developing a tool suitable for steel cutting.
Stage 2 – Prototype design (Development)
Together with the elements transferred from NIA_WWU_013, a prototype cutter will be produced for undertaking trials in a controlled environment within a workshop environment (thus mitigating risk to the customer). Where weaknesses in design are identified the prototype will be modified accordingly.
Stage 3 – Field Trials (Demonstration)
Once proven in the controlled environment, the prototype will be used for a minimum of 10 field trials within our Network area.

Scope

This project will design and develop a prototype tool that will be tested thoroughly through onsite trials & further development, specifically:
- Design and develop a cutter to allow the removal of a window from a steel main that has been inserted with PE. It is assumed that the existing ductile window cutter design will be used as a starting point with a focus on two key areas for modification; the air powered motor and blade system;
- Develop a working prototype and carry out off site testing in the order of 20-30 operations;
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- Recommend any necessary modifications

This tool needs to be simple and safe to use and be able to work within a typical service excavation without requiring additional cost excavating or damaging other utility apparatus.

Objective(s)

The objective of the project is to develop a tool that is able to cut a window in steel mains up to a thickness of 9mm. The tool must be:
- A simple tool that can be used effectively by trained staff and not require a specific licence to operate;
- A safe non-sparking technique;
- A compact tool suitable for small, shallow excavations; and
- Cost effective and able to move to commercial production

The tool will be developed to deliver benefits such as cost savings when compared to current available techniques for replacement of steel mains, customer benefits through quicker, faster replacement of mains and environmental benefits with less digging up and wastage when this tool is used.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

To produce a hand held window cutting tool that has been tested in the field and that is at a stage to be transferred to business as usual for all networks advantage.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

To maximize the potential of this project, we will develop two prototype models that will be trialed across the network area following the initial design and development stages and will include all modifications identified and agreed during the trial stage.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The design and development of the tool will be at Steve Vick's offices which will then be trialed across the network area. The locations will be determined by the replacement programs (yet to be identified).

Revenue Allowed for the RIIO Settlement

WWU have an allowance for the replacement of mains and it is likely that there will be savings on the cost of labour and time if this project proves successful.

Indicative Total NIA Project Expenditure

The total project cost is
Total external costs £55,000
Total maximum internal costs £18,333
NIA eligible expenditure - £73,333

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

n/a

How the Project has potential to benefit consumer in vulnerable situations:

n/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

There are cost savings and customer benefits achievable by each network if the following three limiting factors can be overcome by the outputs of this project. The limiting factors that add cost to our business and affect customer supplies are:
- The lack of safe cutting tools for steel pipes
- Open cut and dead insertion is the only replacement method available which is costly, inefficient and highly unfavorable for our customers and the environment.
- The difficulties in providing a service connection to new customers and developers where an inserted steel main is present can require larger excavation, road closure which add time and cost to projects.

By developing a window cutter for steel mains, all networks can efficiently replace steel mains, achieve a reduction in number of interruptions and potentially provide a lower average interruption time.

Please provide a calculation of the expected benefits the Solution

The business benefit reflects the financial advantage of live insertion over dead insertion (in financial terms)
- a reduction in purge and relight
- a reduction in service excavations based on live main insertion average push length
- a reduction in customer interruption times

The net benefit of the switch to live insertion and the removal of the second purge and relight is estimated at a reduction in cost per metre of steel main replacement of £1.00/m. This reduction based on a service frequency of 30m on the existing steel main. Estimated steel main volume, excluding consequential steel, in 2016 / 2017 programme is 24.4km; therefore potential savings would be at maximum £24,400 per annum.

Assuming this project successfully delivers its objectives, the approximate method of calculating the expected financial benefit if all Gas Distribution Networks were to fully integrate the technology within their operational environment is to multiply the potential savings by a factor of 8 – Based upon a network length ratio of 4:2:1:1.

Please provide an estimate of how replicable the Method is across GB

The use of the steel cutting tool, on completion of development, can be re-created across any network whilst undertaking replacement

activities on steel mains.

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

We anticipate the costs will be predominantly through purchase of the equipment, maintenance of the equipment and training in its use.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 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 system 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

RIIO-2 Projects

☐ A specific piece of new equipment (including monitoring, control and communications systems and software)

☐ A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven

☐ A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)

☐ A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology

☐ A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution

☐ A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

Our stakeholders consider our mains replacement programme, targeted at removing old metallic mains and reducing the risk of gas explosions, to be a priority. They continue to tell us that they value works which are completed as quickly as practical and with minimum disruption. This tool seeks to meet these aims and would easily be adopted across the other networks for equal benefit.

This project draws on the learning from a successful NIA project where a tool for the safe and effective window cutting of ductile mains was developed (see WWU_NIA_013) that created a 66% improvement in efficiency against traditional methods recorded during the trials undertaken within the Wales & West Utilities network area.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

To look for alternative approaches to optimise our mains and services replacement activities that will deliver outstanding service to our customers by reducing customer disruption and deliver value for money by reducing the time it takes to carry out the work.

☑ Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

☑ Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

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

n/a

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

n/a

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

n/a

Relevant Foreground IPR

n/a

Data Access Details

n/a

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

n/a

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

n/a

This project has been approved by a senior member of staff

☑ Yes