An old problem, still in place!

- Global population predicted to be > 9 billion by 2050.
- More than 70% of the world population predicted to live in cities by 2050.
- A projected 43% increase in traffic for the UK from 2010 to 2040.
- Utility services are essential to the quality of life in modern urban living.
- More than 4 million holes are excavated in the UK’s roads each year.

### Main aim

To develop a sustainability costing model alongside an evaluation framework and methodology for utility streetworks to allow the assessment of interventions, based on the true total costs and impacts (economic [direct and indirect] + environmental + social) balanced against the full range of benefits to support investment decisions.

### Objectives

- Development of a Streetworks Sustainability Assessment Framework (SSAF).
- Development of a balanced approach for deriving economic, social and environmental indicators / input parameters for streetworks.
- Establish suitable methods for assessing sustainability in terms of ‘Value vs Cost’ of streetworks.
- Testing and evaluation of the methodology on test sites in collaboration with ATU project partners to establish an evidence base of case histories.

### FRAMEWORK FOR UTILITIES SUSTAINABILITY IMPACT MODELLING

**SSAF Methodological Development**

- Conceptualising the SAF framework (2 phases):
  - Decision making tool (SPeAR-based methodology)
  - Social and environmental accounting
- SPeAR® for Utility Streetworks is based on the adaptation of the SPeAR® framework and development of new sets of sustainability indicators specifically for streetworks
- Four sets of indicators were developed based on four headline indicators (Direct Economic, Indirect Economic, Social and Environmental)
- Aim to minimise the cost / impact on all 4 categories

**Total Sustainability Cost (TSC) of streetworks is defined as:**

\[
TSC = \text{Direct \_Economic} + \text{Indirect \_Economic} + \text{Social} + \text{Environmental}
\]

**Questionnaire** – to validate the developed indicator sets and to capture expert opinion on their importance and applicability – distributed to a wide group of industry experts (20 participants):

**Example set of Indicators for Indirect Economic Costs**

- Third Party utility damage
- Compensation to customers for interruptions to services
- Compensation to local authorities for damage to their assets
- Goodwill
- Required re-funding (opex)
- Insurance
- Loss of business to competitors
- Lost Opportunity Cost

**Testing and Evaluation**

The developed SAF framework and Sustainability Assessment Model is being applied to a number of case studies, including:

- The University of Birmingham campus utility services network
- Utility services of the Queen Elizabeth Hospital in Birmingham
- Pipe Subways in London
- Various Trenching and Trenchless utilities projects in different areas of the Netherlands, including:
  - Amsterdam
  - Rotterdam
  - Utrecht

**Connection to Affiliated Research**

This research will build on previous resilience and sustainability projects, including the EPSRC-funded Designing Resilient Cities research, and link closely with ongoing affiliated research including:

- iBUILD: Infrastructure BUiness models, valuation and Innovation for Local Delivery – www.research.ncl.ac.uk/ibuild

The main purpose is to advance sustainable streetworks and infrastructure resilience and to use the outcomes of the work to conjunct with the ATU Decision Support System to support intelligent and sustainable streetworks.

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**An Integrated Performance Model of City Infrastructures**

**Sustainability Costing Model for Streetworks in Urban Environments**

A. Hojjati,1 Professor J. Jefferson1, Dr N. Metje1, Professor C.D.F. Rogers1, Dr Daniella Almeu2

1University of Birmingham, School of Engineering, Department of Civil Engineering, 2Sustainpolis

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**Liveable**

The projected cumulative total cost of utility streetworks in the UK from 2013 to 2030 is £319bn.

**Aim**

In 2014

More

Utility services of the Queen

Conceptualising

Rotterdam

A projected 43% increase in traffic for the UK from 2010 to 2040.

Various Trenching and Trenchless utilities projects in different areas of the

Utrecht

Pipe Subways in London

[Image to 1684x2384]

www.assessingtheunderworld.org

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costs

To develop

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The developed SSAF

framework and Sustainability...