**Strategic Priorities Fund:**

**UK Climate Resilience - Embedded Researcher Scheme**

**Annex B: Host organisation opportunities**

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# **Anglian Water (1)**: “Financial reporting of climate-related risk & opportunities”

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| **Project title**  | Financial reporting of climate-related risk & opportunities |

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| **Organisation name**  |
| Anglian Water Services, Huntingdon, Cambridgeshire |

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| **Project and activities to be undertaken by successful applicant** [limit 750 words] |
| **Understand best practice:*** Create report based on the best research available to understand best practise in the field

**Map the organisation’s existing approach:*** Review relevant company specific literature e.g. our Climate Change Adaptation Reports, Business Plans, Water Resources Plans, Long Term Water Recycling Plan, Corporate Risk Register, Resilience Framework.
* Engage with key stakeholders to gain a broad, external expert view of climate risks facing the water sector.
* Identify areas where the company can improve reporting by performing a gap analysis against the best practise standards

**Create a framework build on the best practise and knowledge of the sector and organisation to enable** the company to create: **Improvement Plan*** Using currently available data, assess the financial impact of climate change on the business
* Recommend how to improve the financial impact assessment
* Recommend improvements to metrics and targets
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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The researcher will be based in the Carbon Neutrality Team at the Anglian Water offices in Peterborough. By being embedded in the team and physically located near to people who undertake long-term water resource management planning the associate will be provided with the support needed to fully understand the importance of the project and how the outputs will be implemented. They will also have support to build the wider network of people within the business to deliver the project. The researcher will have access to a desk and IT equipment. They will be given access to any company data needed to undertake the project. |

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| **Expected outputs & benefits for host organisation**  |
| For the four years we have published an integrated financial report which includes our sustainability reports along side the standard financial reporting. The issuing of a green bond in 2018 highlights our desire to attract investment from organisations concerned about the climate and environment. Maintaining good relationships with our investors is essential for the long term viability of the company. Therefore we are supporting the Task Force on Climate Related Disclosures to ‘develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers, and other stakeholders’. To do this we want to build on the best research to ensure we are reporting both the risks around societal transitions to a lower carbon economy as well as the physical risks of climate change on our assetsThe output of this project will be the development of a framework and methodology that will enable the company to robustly report the financial implications of climate related risks of the company. This will benefit the company by improving investor relations and informing investment decisions around climate mitigation and adaptation activities. |

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| **Expected benefits for successful applicant**  |
| In addition to the benefits gained from working in and understanding the different pressures of a commercial organisation the applicant will have access to Anglian Water’s training programme. This programme includes a diverse suite of courses including personal and skills development and wellbeing programmes. They will also gain an excellent network of contacts within the company and wider sector which will be valuable in their future careers. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)** |
| Anglian Water supplies water and water recycling services to more than six million people in the East of England and Hartlepool. Our business is highly susceptible to the changes to weather that climate change will bring. For example, long dry spells increase the risk of water supply interruptions and increased costs to the company as additional labour & materials are needed to reduce leakages due to ground movement and the need to maintain the supply/demand balance. Conversely, intense rainfall increases the risk of flooding and also increases cost e.g. pumping excess water from the system. The infrastructure we create today will continue to be used well into the next century and therefore we need to understand how to best translate climate risks into our decision making and how changes in climate and weather patterns are impacting our assets. The company is therefore relevant to the Climate Resilience programme foci of climate risks and hazards; decision making around day-to-day and future operations and infrastructure; and the need for a climate service to inform decision making and horizon scanning.Climate change also poses a challenge to the financial viability of the company. Investments in the water industry are generally long term and climate-related financial risk disclosures are becoming increasingly important for our investors to evaluate the risks we face and understand how we are mitigating those risks. To ensure we are giving our investors and other stakeholders the best information on which to base their investments we need to understand how to use the data we have to underpin the reporting of climate related targets and metrics to support our understanding of the financial impact of the risks of climate change. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Matthew Pluke | Climate Change & Carbon Manager | Carbon Neutrality | mpluke@anglianwater.co.uk 07702 341005 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full time |

# **Anglian Water (2)**: “The impact of weather and climate change on water company performance”

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| **Project title**  | The impact of weather and climate change on water company performance |

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| **Organisation name**  |
| Anglian Water Services, Huntingdon, Cambridgeshire |

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| **Project and activities to be undertaken by successful applicant**  |
| 1. Understand best practise around climate resilience
2. Identify & review existing processes and reports which describe the impact of weather on business performance e.g. Severe Weather Matrix, Climate Change Adaptation Reports, Business Plans, Water Resources Plans, Long Term Water Recycling Plan, Corporate Risk Register, and Resilience Framework.
3. Review historical data held by the company relating to historical asset performance, links with weather data and financial consequences of any asset failure
4. Identify gaps in the company’s understanding and decision making
5. Develop a new or improved tool, or tools, that will enable us to make better decisions based on the frequency of future weather event due to climate change. The tool should include personnel and financial risks in addition to service disruption
6. Engage with a broad stakeholder group within the company and the wider sector
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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The researcher will be based in the Carbon Neutrality Team at the Anglian Water offices in Peterborough. By being embedded in the team and physically located near to people who undertake long-term water resource management planning the associate will be provided with the support needed to fully understand the importance of the project and how the outputs will be implemented. They will also have support to build the wider network of people within the business to deliver the project. The researcher will have access to a desk and IT equipment. They will be given access to any company data needed to undertake the project.  |

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| **Expected outputs & benefits for host organisation**  |
| As a water company we have thousands of infrastructure assets that enable us to deliver our service. However understanding how these perform under what is currently ‘extreme’ weather conditions is increasingly important as patterns of weather events change. The main output of this project would be a tool, or tools, that enable us to better understand the likely operational and financial impacts of changing weather patterns which will enable us to better plan for future weather events. In doing this we will adopt best practice in measuring, managing and quantifying the impact of weather on performance of the company. As a result we will mitigate the risks to our customers and staff of water and sewerage services being unavailable due to weather events. The work will also inform our decision making around the future resilience of our assets which will help us prioritise our investments. The company will also benefit by engaging with the broader UK Climate Resilience Programme, expanding its interaction with the research base. |

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| **Expected benefits for successful applicant**  |
| In addition to the benefits gained from working in and understanding the different pressures of a commercial organisation the applicant will have access to Anglian Water’s training programme. This programme includes a diverse suite of courses including personal and skills development and wellbeing programmes. They will also gain an excellent network of contacts within the company and wider sector. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| Anglian Water supplies water and water recycling services to more than six million people in the East of England and Hartlepool. We recognise our contribution to the greenhouse gas emissions and are committed to ensuring the business is carbon neutral by 2030. Our commitment to environmental sustainability has recently been enshrined in a change to the company’s articles of association. We want to base our decision making around resilience to climate change on the best research and have been working closely with the University of East Anglia through the Anglian Centre for Water Studies. Our business is highly susceptible to the changes to weather that climate change will bring. For example, long dry spells increase the risk of water supply interruptions and increased costs to the company as additional labour & materials are needed to reduce leakages due to ground movement and the need to maintain the water supply/demand balance. Conversely, intense rainfall increases the risk of flooding and also increases cost e.g. pumping excess water from the system. The infrastructure we create today will continue to be used well into the next century and therefore we need to understand how to best translate climate risks into our decision making and how changes in climate and weather patterns are impacting our assets. The company is therefore relevant to the Climate Resilience programme foci of climate risks and hazards; decision making around day-to-day and future operations and infrastructure; and the need for a climate service to inform decision making and horizon scanning. For this particular project we are interested in understanding how company performance relates to weather hazards so we can understand and mitigate the risks of service failure that impacts customers and the environment and the profitability of the company in a changing climate.  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Matthew Pluke | Climate Change & Carbon Manager | Carbon Neutrality | mpluke@anglianwater.co.uk 07702 341005 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full time |

# **Atkins Ltd.**: “Climate risk and adaptation in practice: Co-creation of UKCP tools and decision-making approaches in multiple infrastructure sectors”

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| **Organisation name**  |
| Atkins Ltd. Various UK locations. The most appropriate co-workers are located in Oxford, Peterborough and Bristol. |

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| **Project and activities to be undertaken by successful applicant** |
| The Project and activities are flexible and can be developed with short-listed researchers. The general themes are improvements in the use of UKCP tools and decision-making methods within specific sectors.We envisage that this will involve the following in the selected sectors:HS2 Climate Change Adaptation and Resilience Support:Review and update requirements and design standards based on the findings of UKCP18.Consider how UKCP18 can be used to ensure a climate resilient railway and develop climateadaptation measures in design, operation and maintenance plans.Further development of UKCP18 tools that review changes to extremes including heatwaves,cold snaps and heavy rainfall based on UKCP probabilistic and/or RCM data.Produce a climate change adaptation and resilience strategy.**Regional Water Resource Planning:**Further development of our “Drought Studio” spatially coherent extreme drought projections toassess impacts for long-term planning. We currently implement the rainfall generator of Serinaldiand Kilsby (2012, 2014) and make extensive used of CEH GEAR rainfall data, MORECS and MetOffice HadObs. We are open to further improvements or implementation of new weathergenerator of reanalysis methods.Further development of our “UKCP Climate Studio” tools that provide bias correction and postprocessing of UKCP data sets.Implementation of robust decision-making techniques to ensure ‘low regrets’ investment in thewater sector.**National Grid (subject to procurement of Atkins)**Review of user requirements for risk assessment using UKCP18.Interviews with Atkins and NG experts on risk and adaptation assessment methods.Further development of our “UKCP Climate Studio” tools that provide bias correction and postprocessing of UKCP data sets, to produce relevant metric for the energy sector.Development of framework for assessment of Physical Climate Risks to inform Taskforce forClimate related Financial Disclosures (TCFD) reporting. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Atkins has offices in multiple UK locations and operates in an agile working environment. The members of the climate change team are currently based in Oxford, Peterborough and Bristol. The researcher would preferably be based in one of these locations. However, there is the option to be based in Birmingham with occasional travel to one of the offices above.The researcher will be managed by the Climate Futures Team Leader and will be supported by members of the climate change team throughout their placement. The Climate Futures team are all senior professionals with relevant research experience, publication records and team management experience. The researcher will be a member of the regional office team. They will attend team meetings alongside other members to help them understand other work streams and the wider implications of their work. They will be part of climate change, sustainability and sector technical networks and communities of practice within their chosen sector(s).The researcher will be provided with a company laptop and IT support. Various online training courses and support networks will be available to the researcher to enable them to integrate into the team and understand the company ethos. These include technical workshops, H&S training, mental health/ wellbeing awareness etc. |

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| **Expected outputs & benefits for host organisation**  |
| Atkins already fosters strong links with the university sector and sponsors MScs and PhDs on climate change at UEA and Birmingham University. The main benefits for Atkins are:Fostering links with research and the transfer of new knowledge to infrastructure clients.Improving our company climate risk assessment and adaptation work processes, which is astated key performance indicator of the company Sustainable Development Strategy.Possible innovation in tool development including our Drought Studio and Climate Studio tools.Potential job recruitment after placement of skilled staff to join the company as Climate ChangeAdaptation Consultants.We envisage that the outputs and benefits will include the following:An independent review of how Atkins is using UKCP18 and other climate data to plan for climatechange and aid decision-makers, including the review of tools, interviews with staff and clientorganisations.Comparison of how weather and climate data are used by different sectors we work with andhow adaptive planning is implemented to ensure resilient systems under deep uncertainty.The further development of existing tools or co-creation of new tools for risk assessment andadaptation within each chosen sector.Research recommendations based on learning in these sectors and how Atkins and our clientscan improve decision-making processes. |

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| **Expected benefits for successful applicant**  |
| The applicant would benefit from working on real projects and the practical implementation of climatechange tools and decision-making methods, including:Opportunity to better understand industry needs.Gain an understanding of the day-to-day challenges in infrastructure design and operation.Opportunity to share scientific expertise in a way that influences how strategies, investmentsand how infrastructure is built and managed. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)** |
| Established in 1938, Atkins (part of the SNC-Lavalin Group) is a leading multi-disciplinary and fullyintegrated global design, engineering, planning and management consultancy firm. We are working in several places around the world, across a spectrum of issues, to create a liveable future in line with our Group Sustainability Strategy. Atkins has over 18,000 employees and 152 offices globally including a network of 40 United Kingdom offices with additional offices in 27 countries across Europe, the Middle East, Africa, Asia Pacific and America. Our clients include governments, international development agencies, private organisations and non-governmental organisations.Our team of Climate Change Experts work closely with engineers, economists, planners and otherspecialists across key sectors, to manage risks as well as realise any opportunities presented by climate change. We have well-grounded expertise in the development of unique climate tools, systems, approaches and frameworks, including the application of these across a range of disciplines and sectors to promote climate resilient and low carbon development. Our capabilities and services are tailored to each client and programme or project. These include: Climate Risk & Vulnerability Assessment, Climate Change Adaptation, Climate Change Mitigation, Climate Finance and Economics, Foresight & Scenario Planning and Innovation & Emerging Agendas |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Dr Steven Wade | Associate Director | Infrastructure / Climate Futures | Steven.Wade@Atkinsglobal.com +44 1865 734 002 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | September 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | TBC -Working from Atkins offices and home university |

# **Department for Business, Energy and Industrial Strategy (BEIS)**: “Climate risk data and information gap analysis”

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| **Project title**  | Climate risk data and information gap analysis |

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| **Organisation name**  |
| Department for Business, Energy and Industrial Strategy (BEIS), London |

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| **Project and activities to be undertaken by successful applicant**  |
| Building resilience to the physical risks from climate change will be essential as global temperatures increase. More fully integrating physical risks into the financial system and ensuring adaptation as well as mitigation is sufficiently addressed is a key focus of the UK’s strategy for enhancing climate resilience. In September 2017, the UK became of the first countries to formally endorse the recommendations from the Task Force on Climate-related Financial Disclosures (TCFD). The Green Finance Strategy (2019) emphasises the importance of mainstreaming climate and environmental factors as a financial and strategic imperative. The UK Government expects all listed companies and large asset owners to be disclosing in line with the TCFD recommendations by 2022. Establishing a shared understanding of the financial risks and opportunities presented by climate change is a fundamental part of delivering our green finance ambitions.The Green Finance Strategy recognises that Government can play a role in providing climate-related information to the market in a proportionate manner. This can contribute to reducing information asymmetries and promote transparency in the availability and application of climate risk information. Government already provides a wealth of publicly available climate-related (see Annex B, Green Finance Strategy, 2019), but further work is required to identify the state of play of the availability and readiness of this information for the financial services sector.We propose that a researcher be embedded in the Green Finance team in BEIS to perform an information gap analysis, which could include analysis of:* Available climate-risk and weather data (both publicly and not publicly available)
* Existing channels for acquiring information
* Whether there is information that is required by the financial services sector, but not publicly available
* Information available outside the UK market from other climate modelling hubs

Such an analysis would contribute to work exploring the Government’s role in public provision of climate-related data, and would support effective decision-making. It would also strengthen connections between the financial services sector, the climate risk research community, and policy-makers. We expect the work would complement the upcoming [Climate and Environmental Risk Analytics for Resilient Finance (CERAF) programme](https://nerc.ukri.org/funding/application/currentopportunities/pre-announcement-climate-and-environmental-risk-analytics-for-resilient-finance/) announced by NERC in December 2019. The embedded researcher could also undertake other knowledge exchange activities, for example delivering departmental seminars and working with the BEIS Climate Science team to improve climate resilience knowledge and understanding. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The researcher will be embedded within the Green Finance Team in BEIS, located in our offices in central London. It is expected that line management, and most activity management, will be managed through this team.Mentoring will be provided through the Climate Science team in BEIS, who will also provide oversight and support for conducting science in government. |

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| **Expected outputs & benefits for host organisation**  |
| **Outputs*** Project report detailing results from a gap analysis of climate-risk and weather data for green finance, which would inform decisions around Government provision of data to businesses as part of the Green Finance Strategy
* Departmental seminars around green finance and climate resilience
* Slidepack communicating results of gap analysis and next steps

**Benefits*** Government would gain an in-depth understanding of the climate risk data landscape to inform future policy
* Improved in-house expertise for Government
* Skills, experience and contacts for the researcher in Government and financial sectors
* Researcher would aid in strengthening links between climate resilience research community and Government
* Better signposting of existing information, to increase the impact of data generated by the wider UKRI-funded community.
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| **Expected benefits for successful applicant**  |
| The successful applicant would benefit from a valuable career development opportunity. BEIS operates in an innovative and interactive way with modern, open workspaces and cloud-based technology and communications systems to connect everyone across multiple locations. Our ambition is that secondees will contribute to bringing to life all these values, and we want everyone to thrive during their time with us.The BEIS offer to the successful candidate includes:* **Understanding of how climate change and green finance in Government works** through being embedded in the Green Finance team, and mentorship from the Climate Science team. There would be opportunities for shadowing other teams and individuals of interest.
* **Learning and development** – embedded researchers would benefit from a tailored approach to learning and development and access to a range of high quality opportunities. This could include policy training, how Parliament works (including Parliamentary visits), or communications and personal effectiveness, among others.
* **New networks** – researchers will have the opportunity to build a broad and deep network of contacts across Government and the private sector.
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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| The Department for Business Energy and Industrial Strategy (BEIS) is responsible for business; industrial strategy; science, research and innovation; energy and clean growth; and climate change. Our vision is an economy that works for everyone. We will promote clean growth and take action to tackle climate change, working in partnership with business and international communities.Green finance is a key priority for the Government – to support delivery of our ambitious Clean Growth Strategy, to drive economic growth as part of our Industrial Strategy, and to ensure the UK remains a key driving force in enabling the global transition to a low carbon economy.  That is why the **BEIS Green Finance Team**, in collaboration with HM Treasury, published our Green Finance Strategy in July 2019. The Strategy sets out how we will be driving the growth of green finance, catalysing private investment in support of our domestic and international climate objectives and cementing the UK’s position as the global hub for green investment. An element of this relates to developing the UK as a centre for climate-related data and analytics, and developing the UK’s resilience to future climate impacts. **The BEIS Climate Science team** is an in-house team of climate scientists and statisticians. We:* Lead the delivery and development of the UK’s Greenhouse Gas Emissions Inventory, to track progress in meeting climate targets.
* Manage the UK commitment to and engagement with the Intergovernmental Panel on Climate Change (IPCC), and ensure its findings feed into international and domestic policy.
* Manage a programme of research and observations (including the Met Office Hadley Centre Climate Programme) to support climate science and deliver climate services across BEIS and HMG. Relevant research includes improving estimates of climate impacts at a country level, to inform decision-making to enhance climate resilience.
* Provide tailored advice as required by policy teams across BEIS and HMG, including input to the UK Climate Change Risk Assessment.
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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Jamie Armour | Policy Advisor – Green Finance  | Clean Growth Directorate  | Jamie.armour@beis.gov.uk 020 7215 1023 |
| Rhian Rees-Owen | Senior climate science adviser | Science and Innovation for Climate and Energy | Rhian.rees-owen@beis.gov.uk0207 215 1513 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 9-12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | 2-3 days/week |

# **Bristol City Council**: “Developing an Urban Heat Resilience Plan for Bristol - priorities for tackling heat vulnerability to protect health and reduce harm”

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| **Project title**  | Developing an Urban Heat Resilience Plan for Bristol - priorities for tackling heat vulnerability to protect health and reduce harm. |

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| **Organisation name**  |
| Bristol City Council, Sustainable City Team, 3rd Floor Create Centre, Smeaton Road, Bristol, BS1 6XN |

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| **Project and activities to be undertaken by successful applicant**  |
| The stark reality of climate change and recent UK heatwaves are driving the need to understand urban heat risks in cities like Bristol. We need to protect human health and reduce harm through effective emergency planning and response, and adopt longer-term strategies to modify the urban climate and reduce the risk of heat-induced illness and mortality. **Our core research question is ‘what are the most significant factors driving the heat vulnerability of Bristol’s urban population and what are the projected impacts?’**We view heat vulnerability as a function of heat exposure i.e. proximity to harm, sensitivity i.e. predisposition to harm and adaptive capacity i.e. ability to prepare, respond or recover. Sensitivity and adaptive capacity can vary from city to city so the Embedded Researcher (‘Researcher’) will look at what is relevant for Bristol.1. **Data gathering:**

At the start of the project the Researcher will work with the lead officer to co-define BCC user needs for tackling heat vulnerability, through conversations with key teams including: civil protection, health & social care, highways, strategic city planning, housing, public health and parks. A literature review and data collection will assemble available information on heat risk factors for the City of Bristol (BCC’s administrative area). BCC will provide existing GIS layers and any evidence collected from previous heatwaves. This step will make use of the following data and identify any gaps which require further investment:* Meteorological data from monitoring stations and satellite data.
* Climate change data already collected.
* Heat maps showing land surface temperature derived from Landsat satellite data.
* Blue green infrastructure mapping including satellite-derived Normalized Difference Vegetation Index.
* Socio-economic data describing Bristol’s population e.g. State of the City 2019, Quality of Life survey, Index of Deprivation, Joint Strategic Needs Assessment, Ward Profiles etc.
* Information on physical risk thresholds for assets, people or services i.e. workability/survivability.
* Hospital records such as admissions during heatwaves.
* Real-time and historic air quality data from BCC’s monitoring network.
1. **Quantitative Analyses, Modelling & Spatial Mapping:**

Various research techniques will be used to develop a Heat Vulnerability Index utilising the information collected in step 1. The HVI will identify areas with High, Moderate and Low HVI scores. Maps will also be produced for Heat Exposure, Sensitivity, and Adaptive Capacity. These GIS layers will be integrated into the Bristol Climate Atlas – a vulnerability mapping portal - which is being developed by BCC with partners.In order to develop the HVI, the Researcher will explore:1. The factors which drive heat vulnerability such as urban characteristics e.g. density, vegetation cover; population characteristics e.g. health, deprivation; and infrastructure characteristics e.g. proximity to GPs, transport routes.
2. Physical risk thresholds such as survivability thresholds e.g. tree death and workability thresholds e.g. overheating of hospital wards.
3. Statistically significant relationships which provide insights into the climatic and socio-economic determinants of heat risk. Critically the Researcher will determine the linearity of change in risk factors for different temperature events e.g. are the health risks in hospitals double if a heatwave anomaly is doubled?
4. How to bring together the HVI with data on air pollution and climate change.

The Researcher’s HVI Report will summarise the findings from this step including statistically significant:* Clusters - hotspots and cold spots - plus any spatial outliers warranting further investigation.
* Factors and relationships driving heat vulnerability including areas requiring further investigation.
1. **Bristol Urban Heat Resilience Plan:**

The results from step 2 will enable the visualisation of heat vulnerability at a variety of scales and the identification of critical factors and relationships which determine heat risk. The Researcher will work with the lead officer to co-produce a resilience plan. The aim of this document is to enable a clear linkage to be made between problem areas, key BCC functions and possible adaptation solutions e.g. spatial planning – dense urban areas & increased greening, built environment – overheating buildings & retrofit, public health – at risk communities & targeted health messaging; and emergency planning – vulnerable people & guidance for critical service providers during heatwaves. 1. **Capacity Building Outputs:**

To maximise use of the HVI, a short training pack will be produced using non-technical language for use by officers. This will be integrated into the BCC climate change training programme. Dissemination activities will include briefings for BCC officers and politicians, the Health & Wellbeing Board, the Bristol Advisory Committee on Climate Change and the Core Cities Group (Adaptation & Resilience Working Group) to maximise the impact of this research. We will support and encourage emergent opportunities for the Researcher as they arise.  |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| **Location**: The Embedded Researcher (‘Researcher’) will be based with the Climate Change & Sustainable City Service at the Create Centre, Bristol. The Centre is open from 7am to 7pm, has a café, is on the Metrobus line and is situated next to the City Harbour and parkland.**Co-ordination, guidance and support**: We will provide Project Management support to co-develop & implement the project. This will take the form of regular meetings and day-to-day contact. The Researcher will be considered part of the team attending team meetings, training opportunities etc. The team is a close unit that is interested in and supportive of each other’s work. The Manager will provide supervision and a duty of care to ensure the well-being and performance of the Researcher. Introductions to BCC colleagues and contacts will be made. It is envisaged that the host and academic institution work collaboratively together from beginning to end including meeting the Researcher’s academic ‘supervisor’/wider team as necessary. We understand that the Researcher will also be provided with support by the UK Climate Resilience Champions and may be expected to collaborate with the Met Office and other activities funded through the UK Climate Resilience Programme where appropriate. We will fully support this engagement. **ICT**: Provision of a laptop and BCC account with access to BCC storage and software. GIS support in the team and by the BCC GIS team. **Flexibility**: BCC has a flexible working policy and the Researcher can hot-desk at other council offices and work from home. |

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| **Expected outputs & benefits for host organisation**  |
| **Outputs****Step 1 Data Gathering:** * Work Plan setting out BCC user needs, methodology and programme.
* Data report including inventory of existing data plus any data and knowledge gaps.

**Step 2 Quantitative Analyses, Modelling & Spatial Mapping:** * GIS database & relevant layers. Maps showing Exposure, Sensitivity, Adaptive Capacity & Heat Vulnerability Index.
* HVI report including description of key findings and products. HVI, Heat Exposure, Sensitivity & Adaptive Capacity mapping; zoomed-in screenshots to illustrate key findings; examples of High, Moderate and Low HVI scores plus heat risk profiles for people.

**Step 3 Bristol Urban Heat Resilience Plan:** * Resilience plan which packages-up the characterisation and quantification of urban heat risks so that it clearly links to key audiences in BCC. Linkage between problem areas, BCC functions and possible adaptation solutions.

**Step 4 Capacity-building Outputs:*** BCC has the skills and experience to maximise the value to be gained from steps 1 to 3 and propose the following products to ensure the long-term impact of this work:
	+ Training pack on using the HVI.
	+ Briefing papers for BCC officers and politicians.
	+ PowerPoint presentations to support dissemination activities.

**Benefits**1. Focused piece of innovative research tailored to BCC’s needs and fills an existing skills & resource gap.
2. Making the best use of existing data and knowledge while also identifying evidence gaps which need further investigation and resource. For instance, insights into measuring spatial and temporal variation in air temperature, or collection of health data.
3. Key messages for most at risk areas, buildings and people.
4. Effectively communicating urban heat risks to key policy and decision-makers showing the scale of the problem and headline actions that can be taken.
5. Critical insights into the vulnerability of Bristol’s population and any exacerbation of existing inequalities due to heat-health risks. This will help with the protection of individuals and communities during heatwaves and the just transition to a resilient city in the longer-term.
6. Creation of risk profiles for vulnerable people and groups which can be used to craft narratives to bring to life heat-health risks for a diverse audience.
7. Identification of statistically significant clusters of hotspots and the significant factors/relationships driving heat vulnerability.
8. Possible evidence on the role blue green infrastructure plays in reducing heat vulnerability with implications for urban planning and future investment.
9. Production of a user-friendly, accessible Heat Vulnerability Index for use by officers in BCC.
10. Engagement work with BCC colleagues will help raise awareness of climate change risks.
11. Production of materials for incorporation into BCC climate change training programme.
12. Utilise the connections of the Embedded Researcher to connect with a wider pool of interdisciplinary researchers who might help us grow this research portfolio over time.
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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| BCC has been leading climate change action for 15 years, reducing its contribution to climate change and preparing for the impacts. The first local authority in the UK to declare a Climate Emergency, Bristol’s Mayor has set the **ambition to become a carbon neutral, climate resilient city by 2030**. The new One City Climate Strategy planned for adoption by March 2020 will bring together many city organisations and partners to create a joined-up plan for Bristol. The Embedded Researcher (‘Researcher’) will be based in the Climate Change & Sustainable City Service. This service leads climate change adaptation work across the authority and works closely in partnership with colleagues, local and national organisations to build resilience to climate change impacts. Our priorities include facilitating evidence-based decision making, embedding climate adaptation into service delivery and collaborating with colleagues and key organisations to enhance knowledge of climate risks and build capacity for action. The team works closely with colleagues in civil protection, flood risk, public health, city design, parks and transport. The UK government, the Committee on Climate Change and the Environmental Audit Committee have identified the need for accelerated action on tackling climate-related heat risks. BCC is working on a local response to this challenge including building a more robust evidence base to support policy and decision-making on city planning, emergency planning and service delivery. The Researcher’s project will focus on the **characterisation and quantification of urban heat as a climate risk** - Objective 1 of the UK Climate Resilience programme. Currently there is a lack of data on how climate-related heat risks will affect the health and wellbeing of Bristol’s population. We recognise that a strong evidence base is central to any efforts to protect human health and reduce harm.We have worked with geospatial experts 4 Earth Intelligence to create land surface temperature maps of the city, our first evidence yet of how heat patterns play out across the city. We are also receiving support from the Met Office through the UK Climate Resilience Programme to develop climate headlines for Bristol using UKCP18 and in our heat risk work. Both 4EI and the Met Office supported us at two events last autumn with the practitioner community and local politicians to improve our shared situational awareness of urban heat risks, review current activities and discuss priorities for the future. BCC has a proven track-record of effective collaboration with academic institutions with a good understanding of what makes these partnerships a success. Our service has successfully worked with undergraduates, postgraduates and PhD students on research projects including hosting internships. The Bristol City Office hosted an Embedded Researcher as the UN Sustainable Development Goals (SDGs) Research and Engagement Associate to embed the SDGs into the One City Plan process. Bristol City Fellowships is a joint programme between the University of Bristol, Bristol City Office and the Social Justice Project for collaborative projects bringing together practitioner and community knowledge alongside academic research. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| **Kathy Derrick** | **Sustainable City Manager** | **Development of Place/Growth & Regeneration** | **kathy.derrick@bristol.gov.uk** **or 07795 445991**  |
| **Lucy Vilarkin (Lead Contact)** | **Sustainability Project Manager** | **Development of Place/Growth & Regeneration** | **lucy.vilarkin@bristol.gov.uk** **or 0117 92 22795** |
| **Alex Norman-Rhodes** | **Environment Technical Support Officer** | **Development of Place/Growth & Regeneration** | **Alex.Norman-Rhodes@bristol.gov.uk** **or 07881 267130** |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Flexible |

# 6. **Church of England (1)**: “Mapping and prioritising the climate risks facing the Church of England’s church buildings, to build resilience of both church and community”

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| **Project title**  | Mapping and prioritising the climate risks facing the Church of England’s church buildings, to build resilience of both church and community. |

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| **Organisation name**  |
| Archbishops Council of the Church of England  |

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| **Project and activities to be undertaken by successful applicant**  |
| * With the project steering group, scope the size and limitations to the project (eg risk types from macro to micro, data production, software, etc).
* Gather and assess existing research into climate change risk mapping (eg the Historic Environment Scotland report, flood datasets <https://data.gov.uk/dataset/a82fdcef-28ca-4371-bb96-38a12cc56994/coastal-flood-zones-version-3-4>)
* Scope existing external data sets, and how they can be used to produce the tool / map needed (for example coastal erosion <https://data.gov.uk/dataset/7564fcf7-2dd2-4878-bfb9-11c5cf971cf9/national-coastal-erosion-risk-mapping-ncerm-national-2018-2021>, clay swell and shrink <https://data.gov.uk/dataset/44bbc251-0dd4-4678-9ca6-19e4cf288642/geosure-shrink-swell-deposits>, stone deterioration research such as See the Monoliths project at the University of Oxford).
* Scope existing data from within the Church of England. This may involve a number of visits to dioceses, and site visits to churches.
* Develop relevant database to produce the tool /map, ensuring that it is compatible with the Church Heritage Record
* Create the analytical tool and generate data for analysis.
* Analyse the data and produce reports.
* Presentations on the project at meetings of key stakeholders including the Church Buildings Council, Diocesan Environmental Advisors meetings, and the Environmental Working Group.
* Presentations at external meetings including regional and national Diocesan Advisory Committee meetings and heritage climate network meetings and conferences.
* Production of final report on the project.
* Social media campaign around the project, with support from the NCIs Communications team.
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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The researcher will be expected to be based in the offices of the National Church Institutions (NCIs) at Church House, Great Smith Street, London. A steering group will be set up for the project. It is expected a member of the researcher’s university will be part of this group, to ensure good communications between the university and host organisation. At the host organisation, the researcher will be line managed by the Cathedral & Church Buildings Division’s Open & Sustainable Churches Officer, with content support from the division’s Head of Conservation and Digital Projects & Outreach Manager. They will have access to all of the administrative, HR, IT and pastoral services at the NCIs. They will also have access to the internal networks the Division is part of, such as the Church of England’s Diocesan Environmental Advisors Group, and the Environmental Working Group, and external networks including the Climate Heritage Network and Historic England. There will be some UK travel. |

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| **Expected outputs & benefits for host organisation**  |
| 1. **Online risk tool /map:**
* **Output:** The creation of an analytical tool/ map which maps all the major climate risks against each of our 15,700 church buildings, rating the risk (e.g. high/medium/low) for the church building. The tool to enable analysis for each church building, but also to enable analysis at diocesan and national level. We picture the tool to be able to produce results such as the Historic Environment Scotland’s “Climate Change Risk Register” (pages 61-122 here <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=55d8dde6-3b68-444e-b6f2-a866011d129a>)

The tool / model will need to be integrated with the Church Heritage Record, so that outputs can be understood at church, deanery, diocesan and national levels.* **Benefits:** This tool/map will have an enormous impact as it will be a publicly available online resources. It will benefit not just the Cathedral & Church Buildings Division, but will provide a tool for dioceses and individual parishes. It will enable parishes to understand the risks facing their church building, and enable them to undertake practical measures to mitigate and adapt their building. This will build their climate resilience. It will enable dioceses to undertake strategic planning for the buildings in their diocese. At national level, it will enable the Cathedral & Church Buildings Division to identify and prioritise further research, guidance, support and advocacy in the areas (both geographically and by risk type) that are the highest risks. The research will benefit the research network by providing base data on climate change risks in every part of England, the impact of which cannot be underestimated.
1. **Publications:**
* **Outputs:** There will be a number of publications from this project.
* Interim and final reports on the outcomes of the project, to be presented to a number of key committees within the Church of England (the Church Buildings Committee, the Cathedral Fabric Commission, the Strategic Buildings Group, the Assets Committee, and the Environmental Working Group).
* Report on the project for external publication, which will be publicly accessible on the Church of England website, and for dissemination at meetings of climate change networks.
* Academic publications on methodology and results
* **Benefits:** The publications will be used by the Church of England, but also will provide a methodology and data for others in the local communities around our churches. The publications will feed into wider climate change research.
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| **Expected benefits for successful applicant**  |
| This is an excellent opportunity for the applicant to work on a project with nationwide impact. It will provide the researcher with an exceptional range of skills and knowledge within a national organisation.The project will provide the applicant with the opportunity to develop excellent communication skills, through the production of reports and publications to both professional and academic audiences, and giving presentations to high level national committees, and conferences. They will be dealing with stakeholders at all levels, from national decision-making bodies such as the Cathedrals Fabric Commission for England, to local church wardens, and as such, will develop excellent stakeholder management skills.The applicant will have excellent networking opportunities through being involved with the National Churches Institutions (NCIs) and its national academic and professional networks.The applicant will be working in a multi-disciplinary division, and will have the opportunity to experience work in a large national organisation. Working within the Cathedral & Church Buildings Division, the applicant will be supported by the division and their expertise in building & historic interiors conservation, digital, and strategic processes. With the site visits to dioceses and churches, the applicant will also experience the impact of their work at national, regional and local levels.The Church of England has 15,700 buildings, therefore the applicant will have access to one of the largest built estates in the country. Few other organisations have our number of buildings, or their diversity, importance, or historic nature. The applicant will be authoring a report that will have national and international impact. The applicant has the opportunity to use their research skills to produce a product with tangible and lasting benefits. |

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| **Expected benefits for successful applicant**  |
| This is an excellent opportunity for the applicant to work on a project with nationwide impact. It will provide the researcher with an exceptional range of skills and knowledge within a national organisation.The project will provide the applicant with the opportunity to develop excellent communication skills, through the production of reports and publications to both professional and academic audiences, and giving presentations to high level national committees, and conferences. They will be dealing with stakeholders at all levels, from national decision-making bodies such as the Cathedrals Fabric Commission for England, to local church wardens, and as such, will develop excellent stakeholder management skills.The applicant will have excellent networking opportunities through being involved with the National Churches Institutions (NCIs) and its national academic and professional networks.The applicant will be working in a multi-disciplinary division, and will have the opportunity to experience work in a large national organisation. Working within the Cathedral & Church Buildings Division, the applicant will be supported by the division and their expertise in building & historic interiors conservation, digital, and strategic processes. With the site visits to dioceses and churches, the applicant will also experience the impact of their work at national, regional and local levels.The Church of England has 15,700 buildings, therefore the applicant will have access to one of the largest built estates in the country. Few other organisations have our number of buildings, or their diversity, importance, or historic nature. The applicant will be authoring a report that will have national and international impact.The applicant has the opportunity to use their research skills to produce a product with tangible and lasting benefits.  |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| The Church of England, with its mission statement of a Christian Presence in Every Community, has 15,700 church buildings in every part of England. (every red dot in the image is a church location.) In many rural communities, the church is the only remaining community building, and is a vital resource for the people living there. Church buildings have proven to be vital resources to communities during climate crises (for example at Fishlake, St Cuthbert during recent flooding in Yorkshire <https://www.churchtimes.co.uk/articles/2019/15-november/news/uk/churches-help-fight-effects-of-northern-flooding>). We therefore need to make our church buildings more resilient to climate change, to ensure they can continue to provide support to their local communities. The first step is to map the climate risks to our churches and to understand the risks for each church and area. Using this information, we can then prioritise resources at national, regional, diocesan and local level to provide strategies, policies and practical information to help churches to become more resilient to climate change.The Cathedral & Church Buildings Division’s role is to provide national advice to our 42 dioceses and 15,700 parishes. We provide advice, guidance and help dioceses and parishes with their decision-making. The Division manages the Church Heritage Record <https://facultyonline.churchofengland.org/churches> which is a national database of all our churches. This climate change risk map would be developed as part of the Church Heritage Record to be an online resource accessible to all. It would act to provide baseline data for all churches on the Church Heritage Record. It would also be used to prioritise the division’s resources into further research and guidance on high risk areas identified by the mapping, both geographical areas and climate risk types.As a division, our funding is limited, with the main focus on managing the Ecclesiastical Exemption planning system. Projects such as this, which would have a major impact on churches, and on wider communities throughout England, require external funding. Without this funding, this project will not be possible. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Catherine Ross | Open and Sustainable Churches Officer | Cathedral and Church Buildings Division | catherine.ross@churchofengland.org0207 898 1865 |
| Janet Berry | Head of Conservation | Cathedral and Church Buildings Division | janet.berry@churchofengland.org0207 898 1889 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | September/October 2020  |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full-time (with flexible working hours) |

# 7. **Church of England (2)**: “Identifying successful adaptation strategies for churches and their communities to help them become more climate resilient”

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| **Project title**  | Identifying successful adaptation strategies for churches and their communities to help them become more climate resilient.  |

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| **Organisation name**  |
| Archbishops Council of the Church of England  |

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| **Project and activities to be undertaken by successful applicant**  |
| This is a very practical research project, primarily through field research, focussed on the questions “What actually *works*, when adapting historic buildings to a changing climate? What can be *done*?”**Case studies**The first phase of work will be identifying a bank of potential case studies, which demonstrate aspects of climate adaptation in churches, heritage buildings, or community buildings. This will involve;* online research
* speaking to Diocesan staff
* speaking to Historic England, Natural England, and other partners
* a “call out” via our partners in the Climate Heritage Network and Fit for the Future

They will then contact the people who manage these case study buildings to engage them in the project, and then – if successful – arrange to interview them. Where possible this will be onsite, so that they can take photographs and / or video whilst they are there, and better understand the context. They will write up these case studies and get them agreed.**Guidance notes**They will research what existing guidance exists from other sources such as Historic England, and then draft guidance for a church context using the existing guidance and the practical case study examples. **Workshops**They will design, arrange, and run Diocesan workshop to share the findings of their research. Assuming 4-6 people attend from each Diocese, this will reach 200 people.  |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The researcher will be expected to be based in the offices of the National Church Institutions (NCIs) at Church House, Great Smith Street, London.A steering group will be set up for the project. It is expected a member of the researcher’s university will be part of this group, to ensure good communications between the university and host organisation. At the host organisation, the researcher will be line managed by the Cathedral & Church Buildings Division’s Open & Sustainable Churches Officer, with content support from the division’s Head of Conservation. They will have access to all of the administrative, HR, IT and pastoral services at the NCIs. They will also have access to the internal networks the Division is part of, such as the Church of England’s Diocesan Environmental Advisors Group, and the Environmental Working Group, and external networks including the Climate Heritage Network and Historic England. There will be extensive UK travel.  |

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| **Expected outputs & benefits for host organisation**  |
| 1. **A suite of case studies of successful adaptation strategies:**
* **Output:** The identification, research and writing of case studies of successful adaptation strategies used by churches, other historic buildings, and other community buildings around the UK and other countries with a similar climate. For example, flood defences, flood resilience (moving fuse boards, changing flooring), protective renders, increased capacity rainwater goods. This could include short videos as well as written case studies. The case studies will be publicly available on the Church of England website, making them of wider use to partners.
* **Benefit:** This would give us a bank of practical examples of what can *actually work*; what beneficial changes can be made which increase resilience, and which are appropriate in the context of historic buildings. These practical examples will be of great use to other parishes.
1. **Creating guidance notes on successful adaptation**
* **Output:** A suite of short guidance notes, addressing different topics illustrated by the case studies, and based on existing best practice uncovered through research.
* **Benefit:** Clear guidance specifically tailored to a church audience. The guidance will be published publicly on our website and shared through our networks, so will be of benefit to those within and without the church.
1. **Sharing the findings:**
* **Output:** Preparing a workshop on climate resilience, based on the case studies, and travelling to dioceses around the country to deliver it, plus a session at our annual buildings conference.
* **Benefit:** Increasing the capacity of our staff and volunteers around the country to understand climate risks and how to *practically* respond.
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| **Expected benefits for successful applicant**  |
| The researcher would be embedded within the buildings team of one of the largest built estates in the country. Few other organisations have our number of buildings, or their diversity, importance, or historic nature. They will be working on a real and relevant problem which is both complex and important; helping us understand *what actually works* when it comes to making churches and their communities more resilient? What practical things can be done, which have been proven to work?The applicant will have exposure to diocesan staff around the country, gaining valuable experience in presenting their work and running workshops. Their development will be supported by our Open and Sustainable Churches Officer, and they can get technical input from our Head of Conservation and case officers.They will also gain insight into working for a national organisation, and will be supported by both the wider division, and their expertise in building conservation, digital, strategic processes as well as the wider church should they wish to engage with other departments; it provides them with an exceptional starting point if they are an early career researcher or recent student. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| The Church of England will be known to you, but what probably leaps to mind is our religious purpose. However, for the purposes of this application, think instead of our massive built estate, with 16,000 church buildings embedded in communities all around the country. The Church of England works across England, in every community, everywhere. Every red dot here is a Church of England church. In many of our rural communities, the local church is the only remaining community building. We have had an Environment Programme since 2005, which has made good progress. However, the urgency of the climate crisis makes us realise we need a major acceleration. We also need to grabble with making our churches and community more resilient to climate change; adapting them where we can.This application is from the Cathedral and Church Buildings Team (CCB) within the Archbishops Council. The Archbishops Council it the registered charity which acts as the “hub” supporting these churches around the country. Within the Archbishops Council, CCB’s role is as a central team giving expert advice on buildings projects, conservation of historic interiors, and the environment. We produce guidance which is published on the main Church of England website and we carry out active case work with the most historic / important church buildings, and with our cathedrals. We offer training, information and advice to staff in the 42 dioceses, who in turn support individual churches. If we were successful in our application, the researcher would be a full member of the CCB team. Our funding as a department is limited, aimed more towards casework management. Research projects such as this one simply cannot progress without external support.  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Catherine Ross | Open and Sustainable Churches Officer | Cathedral and Church Buildings Division | catherine.ross@churchofengland.org0207 898 1865 |
| Janet Berry | Head of Conservation | Cathedral and Church Buildings Division | janet.berry@churchofengland.org02078981889 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | September/October 2020  |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full-time (with flexible working hours) |

# 8. **Coastal Partnership East**: “Delivering local adaptation to coastal change in the East: exploring lessons learned and critical information gaps to inform future UK policy, research and practice”

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| **Project title**  | Delivering local adaptation to coastal change in the East: exploring lessons learned and critical information gaps to inform future UK policy, research and practice |

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| **Organisation name**  |
| Coastal Partnership East (Norfolk and Suffolk) |

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| **Project and activities to be undertaken by successful applicant**  |
| Put simply, knowing what to do, where to do it, and when to act is necessary in order for risks to coastal communities, natural sites and (critical) infrastructure to be managed adaptively before crises arise as a result coastal erosion. However, there is no established precedent or clear guidance for delivering coastal adaptation and a resilient future for our coastal communities.The research will make a valuable contribution by seeking to explore and collate the approaches that can help to solve the key challenges as identified by the Committee for Climate Change, such as adapting to at least 1m of sea level rise, increased risk to coastal properties and accurate information as to the coastal erosion risk exposure. Critically the role will also or identify the gaps in knowledge necessary to enable the appropriate and timely adoption of adaption pathways.Taking a ‘pathways’ approach to planning adaptively for a future coast is central to CPE’s ethos. As part of this, it is important to combine learning from past examples and experimentation with understanding knowledge and scientific information gaps that need to be filled in order to better informing effective future coastal management and decision-making over time. Building upon our work and experience to date, we propose two pillars to this research opportunity in order to support the adaption pathways approach, which together seek to increase our capacity to manage current and future coastal change through adaptation. This will also support a gap identified with Shoreline Management Plan review in relation to the understanding of how sea-level rise will impact on erosion risk frontages with regards to defenced and undefended coasts.**Pillar A: Gap analysis - climate change and the coast.** A technical review to identify gaps in knowledge and available information about coastal processes, and where important scientific information about projected change is needed (but presently unavailable) by coastal management authorities. We need a much better understanding of how coastal processes are likely to respond to projected sea-level rise and other impacts of climate change, and consequently what is likely to happen to our coastline if we are to adapt and create a resilient coastal zone rather than locking-in future vulnerability. Recent work has demonstrated that whilst a lot of attention has been paid to expected coastal flood risk under the most recent projections of climate change, less is apparently known (certainly from our perspective as a coastal management authority) about the likely evolution of coastal erosion over various timescales. For example, where may there be beach loss, overtopping, scour, rapid or gradual erosion, potential accretion and formation of new beach features, etc.This gap analysis is likely to involve:* Scoping interviews with coastal management practitioners within CPE, the Environment Agency to establish perceived gaps in necessary knowledge and information about the impacts of climate change on coastal processes, particularly erosion
* Desk research to establish sources of information, existing research and expertise
* A further series of interviews and enquiries with technical specialists in organisations including the Environment Agency, academics, consultants including Royal Haskoning DHV, etc. to explore factors such as existing modelling capacity, data sources and availability, research needs, and so on.
* A possible review workshop (e.g. comprising coastal managers and technical specialists)
* A report and recommendations

**Pillar B. Next steps for coastal adaptation**How can we build upon what has been learned to date from the experience of developing and delivering coastal adaptation initiatives over the last decade? Much work has already been done by CPE and other organisations to generate lessons and recommendations for informing the development of policy and practice around coastal adaptation but this is not presented in one body of work. There are also opportunities to draw upon other local authorities, Environment Agency, Defra and others to develop a definitive representation of adaptation development to date.This review of lessons about the practice of adapting to coastal change is likely to comprise:* A workshop with CPE personnel to explore, a) key projects, how these came about and have evolved, and overall reflections on efforts to deliver adaptation to coastal change over the last decade, b) what opportunities exist for innovation in coastal adaptation, constraints, barriers, knowledge and policy gaps and needs.
* Guided desk research to gather key documentation about notable projects and schemes, other recent grey literature
* Production of a summary report to document lessons about the practice of adapting to coastal change in Norfolk and Suffolk, future opportunities and recommendations.
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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Coastal Partnership East (CPE) brings together the coastal management resources and expertise from Great Yarmouth Borough Council, North Norfolk District Council, and East Suffolk Council, delivering coastal management through a shared team. The Partnership hosts a shared position with the Environment Agency, works with the Water Management Alliance, the private sector and alongside coastal communities on the Norfolk and Suffolk coasts. As a team we have experience in working across organisations and forging new links to enable successful and sustainable coastal approaches.The proposed research position will be based in Cromer (North Norfolk District Council) whist having access to teams at Great Yarmouth (Great Yarmouth Borough Council) Lowestoft and Melton (East Suffolk Council). This arrangement will maximise the opportunity to work across the wider team, or focus in one or two locations. There would be the opportunity to also work in their academic institution.The research position would have direct access to the CPE team and relevant elected members if necessary. The role would be line managed within the Local Authority (LA) setting through the Coastal Manager with appropriate support, facilities and access to data and schemes made available. The researcher would also be invited and expected to contribute to wider team meetings and provide updates and presentations at appropriate times to the CPE Board and Community Forums. |

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| **Expected outputs & benefits for host organisation**  |
| CPE wishes to build upon its existing experience and the benefits generated when it has an embedded member of the team, with a ‘foot in two camps’. We know that such arrangements pay dividends to the team, local communities and also the partner organisations.This opportunity will assist in forging new and further links with academic research and institutions, assisting them to understand the challenges and opportunities presented to Coastal Risk Management Authorities in relation to the impacts of climate change and adaptation on the coast. 1. *Research capacity:* Having a dedicated researcher working within CPE would accelerate our opportunity to reflect and learn on progress made within CPE on adaptation, future opportunities and a specific gap analysis around the impacts of climate change on evolution of coastal erosion. Publicly funded organisations are resource poor and lack the time and financial capacity to engage in valuable research activities.
2. *Gap analysis*: a specific subject of this work will be to investigate what scientific knowledge and evidence exists and is needed to improved adaptation planning, particularly for cliffed frontages subject to erosion (recent Shoreline Management Plan Review suggests that there is limited understanding as to the impacts that sea-level rise will have on erosion risk frontages).
3. *Reflections and learning to date:* documenting regional learning and progress on adaptation to date, constraints and opportunities for coastal adaptation and delivering resilience in one document.
4. *Building relationships:* The researcher will provide a strong link between CPE and future coastal science research proposals in the University of East Anglia, the Tyndall Centre for Climate Change Research also including Newcastle, Manchester and Cardiff Universities as well as the wider UK academic community and will act as a conduit for new relationship development as well as contributing to strengthening CPE’s partnerships and networks research needs and interests.
5. *Setting an agenda for future research:* An embedded researcher will help us to develop our knowledge base, and will help us inform what is required from future research at the national level to accelerate progress on adaptation and resilience to coastal change.
6. *Publications:* documentation of this research in the form of reports and research papers will act as an evidence base for delivering impact and a foundation for future work and assist coastal managers in identifying opportunities to develop adaptation.

**Outputs** The researcher will lead on the production of the following deliverables: * Minimum of two research reports on coastal erosion/adaptation (see below)
* Library of relevant research papers/information with easy to access summaries
* At least two conference presentations
* Sharing of outputs with local community groups
* At least one journal paper synthesising key insights on coastal adaptation
* Gap analysis of climate change adaptation with regard to erosion risk frontages.

These will form an evidence base which will be of interest to other coastal management authorities, policy-makers in Defra, the Environment Agency, etc. Through the gap analysis and learning generated by this work, it will also possibly inform future calls for research. |

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| **Expected benefits for successful applicant**  |
| An embedded researcher within Coastal Partnership East could expect many benefits arising from this opportunity.Most importantly, this ‘placement’ would present an important opportunity for the researcher to explore the application of academic concepts in practice. Whilst much contemporary academic research is case-based and required (particularly by NERC) to have end-user relevance and an indication of its impact, this research opportunity will be intrinsically rooted in the world of practice. The researcher will experience and be exposed to the challenges and constraints faced by coastal managers aspiring to deliver adaptation in real contexts. During this placement they will be fully focussed on identifying knowledge and evidence needs, and how recent research can inform future practice. This work will advance their understanding of how their future research outputs can better be formulated to support the practice of adaptation and resilience to future coastal change. The researcher will have the chance to work with a range of experts within the CPE and related teams such as: coastal managers, coastal engineers, planners, funding and finance specialists, coastal community representatives, etc. This will contribute to the expansion and development of their expertise and skills base, perhaps acting as a springboard for further study, employment or new research in areas that they may wish to develop in future. As part of this, three people in CPE will act as key points of contact to guide the research, knowledge development and act as mentors for the researcher. This post will present an opportunity for the researcher to establish new contacts and relationships across scales (from community groups to national policy-makers) to increase the impact of their personal research outputs, and build future research potential. It is also anticipated that the placement will enable the researcher to attend some conferences (academic/industry), giving them opportunities for networking and to promote and develop their research interests and crucially to share their lessons about the practice of adapting coastlines to a changing climate. There will be an opportunity to link and contribute to the annual Tyndall Assembly on Climate Change. Additionally, the mentors are keen to act as co-authors to journal papers, which may potentially arise from this research opportunity. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| Launched in June 2016, Coastal Partnership East (CPE) represents an innovative approach to managing the coast on the Norfolk and Suffolk coast. The partnership brought together the coastal management resources and expertise from Great Yarmouth Borough Council, North Norfolk District Council, and East Suffolk Council. CPE works in partnership with the Environment Agency, the Water Management Alliance, community partnerships and many other stakeholders along its 173km of coast. This collaborative and integrated working fits well with the ethos of the Science Plan.The Committee on Climate Change (2018) state that the current approach to coastal management in England is unsustainable in the face of climate change. Indeed, CPE came about through a recognition that in order for place-based interventions and coastal management schemes to make long-term decisions and deliver ‘adaptation’ effectively, coastal governance arrangements needed to more integrated and collaborative. Coastal erosion already poses great challenges in Norfolk and Suffolk – this is a complex and dynamic coast with a long history of engineering interventions and development. Since the early 2000’s, coastal managers in the region have been increasingly dedicated to exploring and implementing ‘new’ options for coastal adaptation, working collaboratively and strategically at a system scale. Projects in Norfolk and Suffolk have undeniably contributed to the contemporary acceptance of a need for coastal adaptation – a managed move away from holding the defence line.For example: * NNDC and its communities were the primary contributor to driving forward the National DEFRA Coastal Change Pathfinder Programme (see <https://www2.north-norfolk.gov.uk/pathfinder/>)
* The Norfolk and Suffolk LA’s were amongst the first to develop and use planning policies to limit development in risk zones and to seek to enable the rolling back of at risk assets.
* In summer 2019 the first UK Sandscaping scheme was delivered at Bacton and Walcott – a partnership project to buy time, work with nature and deliver multi-benefit outcomes.

The impacts of climate change (particularly sea-level rise (100-150mm over the last 50 years) and increased storminess) is exacerbating existing problems of coastal erosion and flooding. Additionally, as SMP policies have, or are moving towards options of no active intervention and managed realignment, implementing measures to enable communities, natural systems and coastal economies to adapt will be increasingly critical. Similarly, there is no clear information to Local Authorities as to how existing assets and beaches will perform in the face of sea-level rise and how this may change the risk profile of communities and coastal assets. At present there is no clear precedent, tested management options, funding solutions or national policy and guidance for coastal adaptation.The work done in Norfolk and Suffolk and the evolution of CPE are playing an important part in informing the evolution of national thinking on adaptive coastal management via the Environment Agency (and emerging FCERM Strategy), Defra, the HoC Environment, Food and Rural Affairs Committee, national and international conferences. CPE intends to continue acting as a trailblazer at the front line in delivering adaptation to coastal change; the opportunity to host an embedded researcher would be of huge benefit. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division / Department** | **Contact details** |
| **Karen Thomas** | **Head of Coastal Partnership East** |  | karen.thomas@eastsuffolk.gov.uk01394 444552 |
| **Rob Goodliffe** | **Coastal Manager (North) – Coastal Partnership East/North Norfolk District Council** |  | Rob.Goodliffe@north-norfolk.gov.uk 01263 516193 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Flexible – full or part-time/split post.  |

# 9. **Department for Environment, Food and Rural Affairs (Defra) (1)**: “Mapping and characterising the evidence base for climate change resilience and adaption in the UK: 1 year fellowship on Adaptation-evidence and policy gaps.”

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| **Project title**  | Mapping and characterising the evidence base for climate change resilience and adaption in the UK: 1 year fellowship on Adaptation-evidence and policy gaps |

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| **Organisation name**  |
| Defra (London, Bristol or York) |

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| **Project and activities to be undertaken by successful applicant**  |
| The project will include the following work areas:**Work Package 1: Evidence review and synthesis of previous Defra research**This work package will review previous Defra research on adaptation in our historic AC03 series of projects to set out the current state of knowledge on risks to agri-food system resilience to climate change, and potential adaptation solutions. The work will take a UK centric view, but frame results in the wider context of international supply chains. **Work Package 2: Critical assessment of Defra knowledge base in the context of current research**Gaps and inconsistencies in the Defra Knowledge base will be characterised and challenged from the perspective of wider evidence in both the academic and governmental grey literature. Again the focus will be on UK production systems, but framed in the context of wider international supply chains. Broader evidence, including new and emerging research will be summarised to update and augment the existing knowledge base as required. Where evidence gaps are identified, recommendations for further research should be set out with details of relative priority from a climate hazard perspective. Results will be mapped against the priorities identified in the Climate Change Risk Assessment (CCRA) and National Adaptation Plan (NAP) as well as other work by the adaptation subcommittee (ASC).**Work Package 3: Policy analysis** Results of work packages 1 and 2 will be brought to bear on the development of new agricultural policies. This will include a characterisation of potential risks for policies proposed under the agriculture and environment bills, and suggestions for effective adaptation strategies. In particular, Defra would value an assessment of emerging agriculture and land strategies to meet the challenge of net zero in the context of climate resilience and potential maladaptation, as well as understanding potential interactions with the forthcoming food strategy**Wider policy interaction:**There is potential for up to 20% of time to be used in supporting the agriclimate policy team on making short timeframe decisions for action on climate adaptation and the rapidly emerging future agricultural policy environment. The role will require working with a number of other policy teams in Defra including Livestock, Arable, Animal and Plant Health, Climate, Environmental Land Management. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Option of Bristol, York or London location for the successful applicant. Defra will provide all travel and subsistence costs for the placement when the project requires travel away from the main office base. A laptop, along with telephony and IT support and access to Defra’s in house network will be made available. |

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| **Expected outputs & benefits for host organisation**  |
| Outputs: A report clearly setting out the state of knowledge on adaptation and resilience issues for UK agriculture. The report should * review existing Defra adaptation research outputs to ensure evidence is reliable, current and relevant
* set out areas where current research diverges from previous findings, or adds depth or nuance to previous understanding
* map knowledge to priorities identified in the CCRA and NAP.
* Undertake gap analysis and set out recommendations for future research

The report will principally consider agricultural production but will look at cross cutting priorities. Benefits: A better understanding of risks and climate readiness issues for agricultural production in the UK to steer and inform future policy. The work will also shape our agri-climate research programme, as well as inform our partnership working with the Met Office Hadley Centre. |

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| **Expected benefits for successful applicant**  |
| Experience of working with a wide range of evidence and policy professionals.Increased understanding on the role of evidence in policy creation in UK government.Opportunities to engage with a range of stakeholders including site visits to a wide range of agri-linked businesses.Regular supervision which will look at potential training, learning and development.Access to a wide range of civil service learning programs. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| The project will be looking at resilience and adaptation of UK agriculture to climate change. Agricultural climate adaptation is a cross cutting area which links to animal disease, water management, wider changes in land use, food security, productivity, and climate mitigation. As temperatures increase and rare meteorological events become regular occurrences, UK agriculture, which utilises the vast majority of UK land, must explore options for resilience against these changes, maintaining high productivity without impacting on biodiversity or increasing greenhouse gas emissions as a result of these changes.Defra is actively engaged in breeding work focused on improving resilience, but new work is needed on diagnosing risks and identifying opportunities to improve resilience in existing systems through management, land use change or innovation. Previous Defra research has examined climate change resilience in UK systems, but the work is now almost a decade old. It would be informative to revisit this evidence base and challenge it in the face of new and emerging research in the literature. Work is required to characterise the existing evidence base, identify gaps and prioritise new areas for research to inform future directions. To maximise the impact of the work, it will be critically important to map the outcomes to priorities identified in the Climate Change Risk Assessment (CCRA) and National Adaptation Plan (NAP) as well as other work by the adaptation subcommittee (ASC). |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Luke Spadavecchia | Farming Science Programme Manager | Future Farming and Countryside Directorate: Farming Science | Luke.spadavecchia@defra.gov.uk |
| Tom Denbigh | Agri-climate science  | Future Farming and Countryside Directorate: Farming Science | Thomas.Denbigh@defra.gov.uk  |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 Months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full time |

# 10. **Department for Environment, Food and Rural Affairs (Defra) (2)**: “Putting flood resilience into operation: How to conceptualise, calculate and measure flood resilience for communities”

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| **Project title**  | Putting flood resilience into operation: How to conceptualise, calculate and measure flood resilience for communities  |

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| **Organisation name**  |
| Department for Environment, Food and Rural Affairs (Defra) |

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| **Project and activities to be undertaken by successful applicant**  |
| Over the coming decades, flood and coastal erosion risks will increase as a result of population growth and climate change. Rainfall patterns will change, extreme weather events will become more common and sea levels will rise. To ensure that we can continue to manage these risks effectively, the government will soon set out its policy direction to better prepare the country for future flooding and coastal erosion – making the most of the opportunities for wider economic, social and environmental benefits in our towns, countryside and coast. This policy statement will focus on increasing the country’s resilience to flooding and coastal erosion.To inform this work, Defra has undertaken a call for evidence and research project investigating how the term resilience is currently used, and whether the different aspects of resilience can be usefully be brought together into one overall concept. The next stage of this work is to launch a research project to investigate how resilience can be put into operation related to: measuring resilience in different sites/for different communities, influencing investment decisions and influencing which actions to increase resilience are undertaken at different sites. The successful applicant will investigate this and propose ways that resilience can put into operation. The successful applicant will undertake research in three areas:1. Fill gaps in evidence about the contribution of measures to increase communities’ capacities to manage risk (such as property level protection, flood warning, emergency planning, awareness raising, community engagement, etc.), to allow these measures to be assessed alongside measures for the installation of fixed or demountable structures. Research is being done to get a better understanding of how property level protection contributes to the reduction of damage (e.g. the Environment Agency’s Property Level Protection Pathfinders). The successful applicant will undertake further work to link other measures of resilience (e.g. capacities) to the reduction of damage, for example change the depth damage curves. This work will inform how a resilience approach can be used to **inform investment decisions.**
2. Develop a methodology to map capacities and resources at the community level and to develop a better understanding of synergies between capacities and where specific resources or capacities to manage flood risks are needed in addition to general resilience capacities. This work will inform how a resilience approach can be used to **increase capacities** for managing flooding and reducing damages.
3. Collect and structure relevant information in a way that allows comparison between places in terms of a resilience profile. Work has already been done in England on developing this kind of tool (Sayers et al., 2017, Environment Agency, 2019b). This work could be built on. The method used should be transparent so that it is clear what elements contribute to the overall score, enabling a more nuanced understanding of the characteristics of resilience in different places. This work will inform how a resilience approach can be used to **assess resilience.**

The work will influence the flooding and coastal erosion programme of work for the next five years.  |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Location: London, York or BristolThe role is in the multi-disciplinary Analysis & Evidence for Floods, Water and Contamination team. The role will be undertaken in the context of the Flood and Coastal Erosion Management (FCERM) research programme, a joint research programme led by the Environment Agency and Defra. You will be part of FCERM and will work in close collaboration with fellow team members, FCERM policy, the Environment Agency, other Defra group bodies and the Welsh Government/Natural Resources Wales. The researcher will be managed by Jess Phoenix, Head of Floods and Water Research. The researcher will have a 1 hour one-to-one meeting with Jess Phoenix every other week and will be encouraged to join the relevant analytical profession in Defra to receive analytical support. Defra proposes to make £50,000 available to the researcher for them to use to conduct primary research as part of the placement. The researcher is able to undertake personal and professional development relevant to the placement and to communicate research with government. Opportunities will be provided for the researcher to present their research to different teams across the department. |

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| **Expected outputs & benefits for host organisation**  |
| The successful applicant will help to ensure the [25 Year Environment Plan](https://www.gov.uk/government/publications/25-year-environment-plan) and the [Draft National Flood and Coastal Erosion Risk Management Strategy for England](https://consult.environment-agency.gov.uk/fcrm/national-strategy-public/user_uploads/fcrm-strategy-draft-final-1-may-v0.13-as-accessible-as-possible.pdf) are aligned to increase resilience to flooding and coastal erosion. The research will directly aid Defra in its development of policy to help build resilience to flooding and coastal erosion. The outputs from the project will be used in the formation of future FCERM programmes of work to increase the country’s resilience to flooding and coastal erosion. In particular to encourage communities to build resilience for future flooding and coastal erosion – making the most of the opportunities for wider economic, social and environmental benefits in towns, countryside and coast. The products from this research will be a timely contribution to our evidence base, informing government policy.The successful applicant will develop our knowledge of community resilience against floods, both now and in the future. This will inform policy making to ensure the UK is flood resilient even in the face of climate variability and change. |

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| **Expected benefits for successful applicant**  |
| The successful applicant will gain first-hand experience of undertaking research for government. The applicant will know how to conduct systematic evidence reviews using the method devised by Collins et al. (2015). They will learn how evidence is created and communicated as part of the policy cycle and develop skills in communicating research with policymakers. This experience will help to increase the impact of their academic outputs across government. Furthermore, the successful applicant will acquire knowledge about policymaking in flooding and coastal erosion and the drivers of this work. They will develop relationships with policymakers and researchers in Defra and become a guest member of analytical groups in Defra. If desired, we can support the successful applicant to share their research with multiple teams across the Defra group and set up mentoring with a principle researcher. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| As set out in the [25 Year Environment Plan](https://www.gov.uk/government/publications/25-year-environment-plan), Defra aims to boost the long-term resilience of our homes, businesses and infrastructure to climate risks including flooding and coastal erosion. In addition, the Environment Agency’s [Draft National Flood and Coastal Erosion Risk Management Strategy for England](https://consult.environment-agency.gov.uk/fcrm/national-strategy-public/user_uploads/fcrm-strategy-draft-final-1-may-v0.13-as-accessible-as-possible.pdf) sets out how flood and coastal erosion management can be best delivered over the coming years using an approach based on the concept of resilience. Much of the work being undertaken to achieve this aim is impacted by climate change. The impacts of climate change are being felt now and the frequency and intensity of many extreme weather events are expected to increase. Defra is the lead department for domestic climate change adaptation and provides the UK’s input to adaptation at EU level. The UK Climate Change Act 2008 is the main legislative vehicle through which Defra promotes climate adaptation and the nation’s resilience to a changing climate. We are preparing for the impacts of climate change through production of five-yearly national assessments of climate change risks, and the implementation of the National Adaptation Programme in response to those risks. The Climate Change Act 2008 sets out the framework for Government activity to address the most significant climate risks we face as a country. It begins with the Government’s Climate Change Risk Assessment (CCRA) which informs the National Adaptation Programme at the end of a five year cycle. Flooding has been identified by the CCRA as a key risk.  Building resilience to climate risks helps to safeguard growth and minimise the damage and disruption to economic activity from severe weather events such as flooding, drought and heat waves. This includes taking action across to prepare for climate change through reducing the risk and providing better protection for people’s homes, farms and businesses across the country. The earlier we plan for adaptation, the less it will cost and we will be better equipped to cope with potential changes. We are constantly reviewing our policies in the light of the most up-to-date evidence such as the findings of the CCRA and the UK Climate Resilience programme. As part of this work, Defra is investigating how to help communities to increase their resilience to flooding. The first stage in this work is to assess the risks posed by climate change, define resilience and assess which measures may help to increase communities’ resilience towards these risks. This work aligns with the UK Climate Resilience programme objective of **‘**characterisation, quantification and communication of climate-related risks’. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Jess Phoenix | Head of Floods and Water Research | Floods and Water, Defra | jess.phoenix@defra.gov.uk0208225890107721124678 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | 5 September 2020 (to be negotiated with the researcher) |
| **Duration of placement (months)** [no more than 12 months] | 12 |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Approx. three days per week (to be negotiated with the researcher) |

# 11. **Department for Education (1)**: “Building climate change resilience in schools and the public sector: Condition Data Collection and Building Stock Model data analysis and Building Performance Modelling of risk factors”

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| **Project title**  | **Building climate change resilience in schools and the public sector** Researcher 1: Condition Data Collection and Building Stock Model data analysis and Building Performance Modelling of risk factors. To include assessment of the environmental performance of different building typologies and the risks and benefits of proposed adaptation and mitigation strategies. |

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| **Organisation name**  |
| Department for Education Design Team, Technical Support, Capital Directorate, Operations Group, Sanctuary Buildings, Level 5, Great Smith Street, Westminster, London, SW1P 3BT  |

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| **Project and activities to be undertaken by successful applicant**  |
| We wish to extend the uses of the UCL Building Stock Model to run scenarios to assess funding alternatives for the stock taking into account flood, fire and crime risk reduction measures. Modelling will be carried out to assess overheating, air quality and energy security risks to improve the climate resilience of the school estate. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The researcher will sit in the Design Team in DfE. They will spend most of their time analysing the CDC and big data sets managed by UCL. They will also work with the Risk Protection Arrangement (RPA) Team in DfE supported by the Government Actuaries Department (GAD) and with researchers in Public Health England working on air quality risks to children in schools. The risk analysis will be supported by the RPA Team and GAD. The RPA is an insurance scheme for academies and Free School Trusts operated by the DfE. |

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| **Expected outputs & benefits for host organisation**  |
| **The aim is to produce risk assessments and maps that can be used by schools and the wider public sector and to define the measures needed for mitigation and adaptation of climate risks across the building stock.**  |

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| **Expected benefits for successful applicant**  |
| Application and integration of very large database building stock models and integration with dynamic simulation tools to run building programme scenarios for a large public sector property portfolio.  |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| Department for Education Design Team published BB101 **Guidelines on ventilation, thermal comfort and indoor air quality in schools in 2018. We work closely with PHE on Indoor Air Quality. This knowledge will define the limit values to will be used with the UCL School Stock model to quantify risk from pollutants, overheating and flooding.**  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Richard Daniels  | Technical Manager, Design Team DfE | Technical Support, Capital Directorate, Operations Group | Richard.Daniels@ education.gov.ukTel: 07769143840 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | August 2021 |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full time |

# 12. **Department for Education (2)**: “Building climate change resilience in schools and the public sector: Socio-technical/financial/actuarial/risk mapping analysis”

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| **Project title**  | **Building climate change resilience in schools and the public sector** Researcher 2: Building climate change resilience in schools and the public sector: Socio-technical/financial/actuarial/risk mapping analysis |

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| **Organisation name**  |
| Department for Education Design Team, Technical Support, Capital Directorate, Operations Group, Sanctuary Buildings, Level 5, Great Smith Street, Westminster, London, SW1P 3BT  |

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|  **Project and activities to be undertaken by successful applicant**  |
| We wish to extend the uses of the UCL Building Stock Model to run scenarios to assess funding alternatives for the stock taking into account flood, fire and crime risk reduction measures. Modelling will be carried out to assess overheating, air quality and energy security risks to improve the climate resilience of the school estate. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The researcher will sit in the Design Team in DfE. They will spend most of their time analysing the CDC and big data sets managed by UCL. They will also work with the Risk Protection Arrangement (RPA) Team in DfE supported by the Government Actuaries Department (GAD) and with researchers in Public Health England working on air quality risks to children in schools. The risk analysis will be supported by the RPA Team and GAD. The RPA is an insurance scheme for academies and Free School Trusts operated by the DfE. |

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| **Expected outputs & benefits for host organisation**  |
| **The aim is to produce risk assessments and maps that can be used by schools and the wider public sector and to define the measures needed for mitigation and adaptation of climate risks across the building stock.**  |

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| **Expected benefits for successful applicant**  |
| Application and integration of very large database building stock models and integration with dynamic simulation tools to run building programme scenarios for a large public sector property portfolio.  |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| The Department for Education Design Team published BB101 **Guidelines on ventilation, thermal comfort and indoor air quality in schools in 2018. We work closely with PHE on Indoor Air Quality. This knowledge will define the limit values to will be used with the UCL School Stock model to quantify risk from pollutants, overheating and flooding.**  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Richard Daniels  | Technical Manager, Design Team DfE | Technical Support, Capital Directorate, Operations Group | Richard.Daniels@ education.gov.ukTel: 07769143840 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | August 2021 |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full time |

# **Department for Transport**: “Transport Climate Adaptation”

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| **Project title**  | Transport Climate Adaptation |

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| **Organisation name** [please indicate location if applicable] |
| UK Department for Transport |

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| **Project and activities to be undertaken by successful applicant**  |
| Reporting directly to the Science and Research Strategy Team Leader; the role will be to:* Work with Met Office and the DfT Risk Assessment Office to develop a methodology (Likely based on the DfT Risk Audit Matrix method) for climate risk assessment. If necessary, further develop current scenarios with the Met Office.
* Collaborate with modal resilience experts across DfT, the Environment Strategy team at DfT and the Met Office to carry out a climate risk assessment for UK transport networks.
* Lead development of a shared evidenced based understanding of climate change risks to transport networks, systems, and services across the DfT family of Arm’s Length Bodies, such as Network Rail, Highways England, the Civil Aviation Authority and the Maritime and Coastguard Agency.
* Lead in developing and carrying out a communication approach for the analysis and findings from the climate risk assessment across DfT to policy, modal teams, and senior decision-makers.
* Represent the Department in cross-Government meetings, and in discussions with transport operators.
* If time is available during the project, you will support the development of practical, proportionate, and actionable Climate Resilience plans based on cutting-edge science and technology.

Maintain own professional expertise and networks through engagement in scientific meetings and conferences.  Support and contribute to staff and organisational development e.g. this could involve delivering outreach activity, training, coaching, and mentoring others, including for the purpose of transferring knowledge on Climate Resilience. It is expected that this project will collaborate with the climate governance projects which are to be funded by the UK Climate Resilience SPF fund, through sharing ways of working and lessons from each project and incorporating them in to this work. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Location: Great Minster House, 33 Horseferry Road, Westminster, London SW1P 4DR. Based in central London, the researcher will have the opportunity to attend meetings and conferences in the UK and Internationally. The Department and team also support flexible working in agreement with individuals. This includes options around working from home; remote locations, and compressed hours. IT (laptop and phone will be provided).  The researcher will have allocated line management and support throughout their placement in line with Civil Service HR Best practice – regular contact with a dedicated line manager (Greg Vaughan, Team Leader, Science and Research Strategy Team) who will agree objectives, workplans, development opportunities and working patterns with the researcher. Support will be provided throughout the placement through regular 1-1 discussions, ad-hoc chats. The researcher will also be expected to participate fully in team meetings and have the opportunity to liaise and work with a number of colleagues in DfT and with other Government Departments and agencies in particular (Defra, Met Office, Government Office for Science).  |

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| **Expected outputs & benefits for host organisation**  |
| This role will support the implementation of a key workstream – further development of a science for resilience capability and evidence base to allow us to base our plans on cutting edge science and technology advice.DfT expects that the key outputs of this role will be:* The development of a climate change risk assessment for UK transport networks
* The communication of this outcome across DfT, and across the DfT family of Arm’s Length bodies
* Engagement with environment and resilience policymakers across the department

At the heart of this role is helping ensure the Department for Transport is able to support a successful outcome at COP26 later this year. This work will enable policymakers preparing for COP26 to draw on the latest science and research to inform their contribution to the conference.The Department has already commissioned Met Office to develop Climate Adaptation Transport Scenarios (CATS) which we expect to be completed by the end of April 2020. The benefit to us that the successful applicant will be able to communicate effectively the science advice generated from this work, and help bring these scenarios through the DfT risk assessment process. This will inform policy colleagues and transport operators in the development of ambition, and actionable plans for the transport sector.DfT also expects to benefit from ensuring that climate risks are understood through cutting edge science. Evidence shows that early understanding of climate risks can present significant savings through the ability to adapt early, and adapt flexibly.We also aim to benefit from building links between DfT and Academia in the Climate Resilience sector, which will enable future collaborations built off the experience and networks created through this opportunity.With this understanding of the climate risks faced by the UK transport network, DfT will be able to lead the transport sector with appropriate policies to address the climate resilience needs of the transport network, and to drive the proportional adaptation of the transport sector. |

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| **Expected benefits for successful applicant**  |
| The successful applicant will be able to participate fully in learning and development activity offered across DfT and the Government Science and Engineering Profession that meets their own development goals and career aspirations. This will include formal training courses, opportunities to shadow senior scientists and policy managers, participate in projects and activities such as Civil Service Live (the flagship annual development event for civil servants) outside of their day to day task that supports the development of capability across the division. The successful candidate will get dedicated line management and support be provided with regular feedback in line with Civil Service HR best practice as well as opportunities to get coaching and mentoring. The successful candidate will be encouraged and supported to maintain their own scientific and professional skills and networks through attending specialist conferences, events and engagement in activities by professional bodies and learned societies. Financial support will be available for conference attendance.The successful candidate will be able to access the centre of government climate adaptation work, with regular engagement across government departments, and with the opportunity to attend meetings such as the CCRA project board and the Infrastructure Operators Adaptation Forum. They will be able to gain key insights in to the working of government climate adaptation which will be able to inform and guide their own future research priorities to be as impactful as possible. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| The Department for Transport works with our agencies and partners to support the transport network that helps the UK’s businesses and gets people and goods travelling around the country. We plan and invest in transport infrastructure to keep the UK on the move. The DfT’s aim is for a transport system that works for everyone and balances the needs of society, the environment and the economy. A key priority our resilience work aims to ensure that the UK’s transport system keeps moving and that we are able to understand, mitigate and respond to the range of natural hazards and civil contingency issues which can arise – for example severe weather (eg flooding, heatwave), space weather, and volcanic eruptions. A key priority for us is to understand better and quantify the risks presented by climate change to transport infrastructure, systems, and services. This understanding will inform the development of actionable operational plans in response to and preparation for climate change risks, and will inform and drive the adaptation needed for the transport network. The Department for Transport National Security Science and Research Division has developed a Transport Science and Technology Strategy for national security (broadly defined to include all risks and natural hazards including climate change adaptation and mitigation).  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Greg Vaughan | Science & Research Strategy Team leader | National Security Science and Research | Greg.Vaughan@dft.gov.uk |
| Asher Lawrence Cole | Head of Academic and International Engagement | Office for Science | Asher.Lawrence-Cole@dft.gov.uk |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 Months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Full time or Part time available |

# **Environment Agency**: “National climate resilience to extreme events”

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| **Project title**  | National climate resilience to extreme events |

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| **Organisation name**  |
| Environment Agency [Bristol or Exeter preferred but we have offices across England] |

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| **Project and activities to be undertaken by successful applicant**  |
| The Environment Agency is the statutory environmental regulator for England. This involves the day to day management, oversight and regulation of the interface between people and the natural environment, including events driven by climatological extremes, such as floods and droughts. Our management of climate extremes is two-fold. Firstly, we develop strategic resilience through long-term environmental planning for flood and coastal risks, water management and industrial regulation. Secondly, we work with civil contingency bodies to prepare for and respond to local and national incidents. Almost all the risks we manage are driven by weather, and will be affected by climate change. We understand the impacts of climate change on average climatology quite well but our increasing capacity to model future climate in more detail now allows us to look more closely at the changing patterns of extreme events which are much less well understood. The latest UK climate projections show we expect to see warmer wetter winters and hotter drier summers but the consequence of this on the extreme events we manage is unclear. Extreme events by their nature are rare and there is little historical evidence on which to base our statistical understanding. They are also often caused by different physical processes to the drivers of average climatology. This means we need to try to understand physical processes which are infrequent both in time and space. Recent advances in climate modelling are attempting to meet this challenge. The UKCP18 Local projections provide 2.2km resolution hourly simulations of future climate. This allows for fine scale physical processes to be much better captured, such as convection which drives intense rainfall events.These advances in climate change science are only just beginning to be explored. The Environment Agency would like to host a research scientist to explore the use of the latest climate change science to understand how the climatological drivers of future extreme events (e.g. rainfall, fluvial floods, storm surges, heat waves, droughts) will change in the future, and the implications for planning national resilience to these events. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The researcher would be part of the interdisciplinary Climate Change and Resource Efficiency research team of eight scientists. The team develops and interprets climate change evidence to support national climate resilience across the Environment Agency’s remit, including flood and coastal risks, water management, industrial regulation, freshwater biodiversity and some spatial planning matters. As an active member of our team, the researcher would be involved in our weekly team meetings and all relevant climate change discussions. The Environment Agency is a dispersed organisation and most meetings are virtual but some national travel is expected, especially to Bristol. The researcher will be supported through line management, peer-to-peer support and an advisory board who will agree research aims and outputs. They will be encouraged to develop a flexible workplan to accommodate arising opportunities including relevant academic opportunities such as writing papers for publication and attending workshops and conferences. They will be given access to Environment Agency data and systems. We will also support them to engage with researchers and policy-makers inside and outside the Environment Agency (including the UK Climate Resilience Programme) to gain a broad understanding of climate resilience and its application to priority national climate risks.  |

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| **Expected outputs & benefits for host organisation** |
| **Aims, Objectives and Outputs*** Identify how the latest advances in climate change modelling science can benefit the Environment Agency’s approach to climate resilience for priority national risks.
* Use the latest climate change science to understand how future changes in climatological drivers will affect the magnitude and frequency of extreme events such as flooding and drought.
* Explore where the latest climate evidence suggests we face a resilience deficit, based on current planning assumptions.
* Review and quantify the uncertainty in future projections of extreme events and propose approaches to manage uncertainty in delivering climate resilience.
* Work closely with Environment Agency colleagues to develop guidance on interpreting climate science for resilience planning.

**Benefits*** Improve understanding of nationally significant climate risks from extreme weather, using the latest climate projections.
* Develop and embed new approaches to inform strategic national resilience planning for extreme events.
* Improved links between national resilience planners and the resilience research community to help co-create specific research projects and shape the research agenda.
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| **Expected benefits for successful applicant**  |
| * Research climate change impacts on extreme events of importance to the Environment Agency.
* An opportunity to use your scientific skills to shape national resilience planning
* Experience of working in a team of inter-disciplinary climate change scientists at the interface between academic research and practical implementation of research evidence.
* A chance to understand practitioner needs and to shape future research to meet these.
* Developing new skills, networks and insights to ensure your research has high impact and influence.
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| **Host organisation summary (including relevance to UK Climate Resilience programme)** |
| The Environment Agency is the national environmental regulator for England, with statutory responsibilities for flood and coastal risks, water management, industrial regulation and protecting aquatic wildlife. We have operational, advisory and regulatory roles across our remit.We play a central role in national climate resilience, working with government departments and other partners to manage the biggest climate risks identified in the National Adaptation Programme (i.e. flooding and water availability). As a Category 1 responder under the Civil Contingencies Act, we also play an important role in helping communities, businesses and wildlife to prepare for and recover from the impacts of flooding, drought and environmental (pollution) incidents. Climate resilience is integral to all our work.We have approximately 10,000 staff, mainly based in local teams across England. The researcher will be embedded in a national climate science team that provides technical advice and analysis to support national decision-making. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Ralph Ledbetter | Research Scientist | Research – Climate Change | ralph.ledbetter@environment-agency.gov.uk07464 923389 |
| Harriet Orr | Research Theme Lead | Research – Climate Change | harriet.orr@environment-agency.gov.uk07900 650169 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | September 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full time - Can be flexible depending on researcher |

# **Flood Re**: “Development of a framework to monitor flood resilience and minimise the need for a UK cross-subsidised flood insurance scheme”

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| **Project title**  | Development of a framework to monitor flood resilience and minimise the need for a UK cross-subsidised flood insurance scheme  |

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| **Organisation name**  |
| Flood Re |

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| **Project and activities to be undertaken by successful applicant**  |
| This research will seek to further the work to develop a framework whereby investment in flood defences and climate risk are evaluated side by side to assess what the expected risk changes will be by 2039. This will be undertaken alongside projected changes in population. Linking the external threats to Flood Re alongside quantitative measures to better understand the progress being made to reduce flood risk and increase flood resilience is of vital importance. The research partner would work with Flood Re to develop both climate and investment metrics and to develop a framework whereby Flood Re can evaluate the likely situation in 2039 when it is due to exit the market. Expected activities for this project will include but are not limited to: 1. Additional code developed in Python and SQL to link climate data from sources such as the ECMWF to Flood Re’s cloud computing facility
2. Modelling approach to link climate metrics to Flood Re exposure and the UK market database in both the short and medium terms (output from weather models) and long term climate projections
3. A dashboard such that information is accessible to Flood Re to support its data development and ability to track its journey to Transition
4. A literature review to provide context and insight to the work that has been completed and to outline the relative limitations of the different datasets and their use within the Transition framework
5. Presentation to key stakeholders within Flood Re

It is envisaged that the researcher will undertake a literature review in the first instance in order to establish the climate, weather and hydrology priorities and how to scale UK flood data to a national view of risk using statistical approaches. Data on flood defences will be incorporated to establish on a deeper level whether investment in flood risk is likely to be sufficient and a literature review and interviews with relevant organisations will be necessary in order to establish the anticipated data errors and the appropriate treatment within the Transition metrics.Following a literature review the researcher will begin to use existing data sets and to source external open source data. The researcher will receive support from the Flood Risk Specialist to select appropriate modelling approaches and to establish a series of statistical models to both explain and predict the expected changes to flood risk. According to the interests of the researcher, this could include the development and prototyping of new pricing models to support Flood Re to evaluate risk within a multi-model framework and to incorporate this into the Transition risk framework. The researcher will work with the Flood Risk Specialist, Actuaries and Head of IT to put the code that is developed into a production state by working with the existing software developer. This will follow a process that has been established at Flood Re using Python and SQL code so that any relevant insights (not necessarily all models) are automated using APIs. |

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| **Expected outputs & benefits for host organisation**  |
| The outputs of the research will be a series of quantitative climate indices that Flood Re can use to evaluate its risk exposure both on a seasonal basis and under future climate change scenarios. Linking claims data to climate indices and flood data in the UK is envisaged to be the primary approach. Work has begun on some initial metrics for Transition and additional work to build out the climate risk will be the focus. Flood Re has developed a cloud computing capability and is working with a software developer to automate its flood event response (to evaluate its exposure to flood events given flood outlines established from both models and drone images). At a higher level the outputs will be to support Flood Re’s strategic development and to provide a deeper evidence base to act upon. The benefits for Flood Re are expected to be a clearer quantitative evaluation of how flood risk is likely to develop up until 2039 and what measures (such as investment in flood defences) are likely to reduce flood risk. The improved understanding will enable Flood Re to better target and prioritise its engagement activities and will support further evaluation of additional climate predictors and open source datasets. The work will bring existing projects outlined above together where relevant and will enable Flood Re to cement its existing findings in relation to climate change. Additional benefits to Flood Re include additional technical support as it builds up its internal research programme and a focus for climate expertise in addition to the Flood Risk Specialist. Flood Re is maturing quickly within the climate space and the researcher will support the Flood Risk Specialist to both establish its internal research and influence Flood Re Executives to continue to adopt a research led approach. The benefits to Flood Re of this are that it has a strong evidence base with which to influence government spending priorities and to direct its strategic objectives. The focus of Flood Re is towards the insurance industry and the researcher will provide guidance to support integration of climate and flood data with this in mind.  |

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| **Expected benefits for successful applicant**  |
| The expected benefits for the successful applicant include mentoring by the Flood Risk Specialist who holds a PhD in flood and rainfall research using statistical approaches. Additionally, the applicant will gain experience working in a research environment in industry and have the opportunity to shape the direction of work. Working within the Transition team, the researcher will be in a small and friendly organisation that balances multiple external stakeholders alongside its reinsurance business. Flood Re is a relatively unique organisation in that it was established by an Act of Parliament but is funded by the insurance industry. It also has a need to work closely with organisations such as the Environment Agency and Defra and as such operates within a fast paced and dynamic culture.The successful applicant will gain experience within the insurance industry and exposure to how flood catastrophe models are utilised and risk is priced using models. The researcher will be able to attend some industry events to gain exposure and understanding of insurance and will be able to present research and findings to key stakeholders within the business including Flood Re’s insurance broker. Additional benefits to the applicant will be to gain skills of communicating science to a non-technical audience, including communicating complex ideas of strategic importance. Being able to link research work to Flood Re’s Transition objectives and aligning findings to its research strategy is a high priority and the development of soft communication skills will be a significant benefit of working within such a small and diverse organisation as Flood Re. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| The Water Act 2014 established Flood Re in the UK to ensure that household insurance continues to be available and affordable to those at high risk of flooding until 2039 at which point the scheme will exit the market. Flood Re has two parts to its purpose. The first is to act as a reinsurer for the flood component of household insurance policies for properties built prior to 2009. The second is to support the insurance market to move to a situation where pricing is reflective of the underlying risk, while retaining a high rate of insurance penetration post 2039. The way to achieve a successful Transition is not yet mapped out and will change according to the likely risk profile in 2039. Additionally, changes in insurance products, technology and population demographics are likely to influence Flood Re’s exit in 2039. These need to be considered early in order to ensure the exit is smooth.However, in order to achieve a successful Transition out of the market, both flood risk and its associated losses must be reduced to a level whereby insurers are comfortable to offer premiums at an affordable rate. Given the dynamic nature of climate change and increasing population rates, this exit may be at risk unless there is ongoing investment in flood defences and property level resilience measures. Flood Re has identified a number of policy interventions that need to be true in order for this to occur and is beginning to investigate how these may best be monitored. To date the data sourced relates to property and flood risk maps and further work to link climate indicators and climate change projections to Flood Re’s Transition plan.Flood Re is a relatively small and young organisation that is seeking to develop a research capacity. It has/is undertaking research on:1. The benefits of flood defences in the UK using an external catastrophe model
2. Future climate change impacts to its risk portfolio
3. The link between claims data and property level resilience
4. Incentivising household action on resilience
5. Social vulnerability and insurance penetration
6. The benefits of maintenance of flood defences and the expected deterioration over time without ongoing investment

Technical modelling expertise within the organisation includes a Flood Risk Specialist and an Actuarial function. As a regulated organisation, Flood Re has a requirement by the Prudential Regulation Authority (PRA) to understand both flood catastrophe models and its exposure to flood risk. Additionally it has a purpose to Transition the market to risk reflective pricing. A researcher under the UK Climate Resilience Programme would both contribute to the developing research capability, undertake work to materially move Flood Re strategy forward and generate insights that support its regulatory requirements.  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Dermot Kehoe | Director of Transition and Communications | Transition and Communications | dermot.kehoe@floodre.co.uk |
| Emma Bergin | Flood Risk Specialist | Transition and Communications | emma.bergin@floodre.co.uk |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | 1-2 days in office a week |

# **Government Actuary’s Department**: “Flood risk in government buildings, impacts and mitigating actions”

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| **Project title**  | Central government departments have a financial interest in a range of buildings across the UK.  GAD, working in conjunction with these central departments, would like to explore how the flood risk faced by these buildings may evolve over the medium term (broadly 5, 10 and 20 years) and mitigating actions that can be taken to reduce the likelihood and severity of losses. |

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| **Organisation name**  |
| Government Actuary’s Department |

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| **Project and activities to be undertaken by successful applicant**  |
| An appropriate candidate would possess a detailed understanding of the potential impacts of climate change on flood risk, and combine this with analytical, written and verbal skills to derive the required output and communicate this to relevant stakeholders. To do this, we expect the candidate to undertake the following activities / possess the following skills:* Have coding and general software skills to undertake the analytical aspects of the project and provide appropriate outputs such as UK wide flood maps under various future scenarios, summaries of impacted buildings and a range of financial consequences of flooding events.
* Able to collate and analysis large datasets.
* Work with a range of other professionals across government where their input is required
* The work will need to be documented and the technical aspects subject to internal quality assessment and peer review.
* A range of formal and informal presentations to the government departments with a financial stake in the underlying properties is expected
* Meetings with other interested parties to explain the methodologies employed
* Provide insight into their climate change activities being undertaken within GAD
* We would expect the individual to manage their workload, deliver work on time and understand the scope of advice, client’s needs and objectives.

GAD would provide the individual with appropriate support in order to achieve these outputs. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher]  |
| The placement will be based at our London office near Chancery Lane. It is expected that the applicant would work on site at our London office. However, GAD does offer flexible working arrangements, subject to operational requirements, including flexi time, working from home and part time working. The applicant will be assigned a line manager and a mentor to help their development. They will also be assisted by a project manager to help facilitate their work. The applicant will receive full HR and IT support including access to the relevant computing programmes at GAD (e.g. actuarial software, SAS, R etc). GAD would regularly liaise the academic organisation (the ‘home’ department) to ensure that the programme is working effectively as possible. |

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| **Expected outputs & benefits for host organisation**  |
| GAD, and the central departments that we work with, are looking to gain a better understanding of flood risk, how this may evolve, and the practical actions that can be taken to mitigate the risk.  In the first instance, we would look to explore these issues with a particular department who will provide the necessary data around the location and construction characteristics of their property portfolio.  Depending on the success of the project, we would look to replicate the concepts employed for this particular department to other property portfolios, and we would look to promote the capability by arranging a cross government event to showcase the work that has been undertaken.The embedded researcher would bring further expertise in spatial modelling, linking different sections together (e.g. flood risk, infrastructure, population information) and presenting the geographic distribution of risks. We would expect the research to be involved in creating models to illustrate these spatial risks.The research would help also GAD with communication of climate related risks. For example, on whether adaption or mitigation of risks is desired and to what extent can the flood risk be ‘tolerated’. We expect there to be scope for the applicant to present their work to government departments, in order to present policy recommendations.  |

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| **Expected benefits for successful applicant**  |
| The applicant would benefit from translating their expert knowledge to support decision making in government. The applicant will also experience first-hand how work such as this, impacts decision making to reduce risk in the public sector; potentially leading to policy making and helping the UK government better prepare for the future. The individual would have an opportunity to learn the techniques and tools that actuaries use to assess financial risk. For example, evaluating data, assessing risks using actuarial techniques, producing financial models and reporting on these results. The successful applicant will also gain valuable insight into how insurance modelling works and how it is used to mitigate against future risks. The applicant would work in our ‘Insurance and Investment’ division. This team has extensive insurance experience and by working with insurance actuaries in our department, the individual would gain skills in communicating risk, drafting of reports and managing stakeholders. The individual would also participate in the graduate training programme to benefit from the training we provide to our graduates (e.g. software training). The individual would have access to Civil service wide learning opportunities including access to the Knowledge Hub and Civil Service learning. The individual would also have an opportunity to get involved in GAD’s sports and socials including (but not limited to) Yoga, cricket, football, board games etc.  |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| At GAD, we advise government on significant policy initiatives where understanding and quantifying financial risks are critical elements to good decision making. Our goal is to integrate analytical techniques into the business of government to achieve better outcomes for decision-makers and the public. Central government departments have a financial interest in a range of buildings across the UK.  GAD, working in conjunction with these central departments, would like to explore how the flood risk faced by these buildings may evolve over the medium term (broadly 5, 10 and 20 years) and mitigating actions that can be taken to reduce the likelihood and severity of losses.The work that the researcher will undertake links up well to climate resilience programme and meets the three key objectives:1.Characterising and quantifying climate-related risks2. Managing climate-related risks through adaption 3. Co-producing climate services Our vision is that GAD would work closely with the climate researcher to benefit from the knowledge of climate risks in order to help assess the financial impact of these risks so that risk management strategies can be implemented. This provides a good opportunity for co-exploration of climate information needed for decision making. By having a foot in both an academic organisation and GAD, the embedded researcher would act as a knowledge broker with respect to the management of flood risk. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Matt Kirkpatrick  | Actuary | Government Actuary’s Department | 020 7211 2975 |
| Louise Fletcher | Actuary | Government Actuary’s Department | 020 7211 2747 |
| Chris Paterson | Actuary | Government Actuary’s Department | 020 7211 2623 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | From August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 6 Months – 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | To be negotiated with individual.  |

# **Lloyds Banking Group**: “Detecting historical climate change trends in UK flood risk for application in insurance risk modelling”

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| **Project title**  | Detecting historical climate change trends in UK flood risk for application in insurance risk modelling |

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| **Organisation name**  |
| Lloyds Banking Group, Lovell Park, Leeds |

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| **Project title**  | Detecting historical climate change trends in UK flood risk for application in insurance risk modelling |

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| **Project and activities to be undertaken by successful applicant**  |
| The applicant will investigate climate-change related impacts on inland flooding in the UK, to inform insurance modelling of the risk for solvency, pricing and stress testing purposes. The project will characterise and quantify climate-related risks, providing outputs for LBG as an insurer to manage climate-related risks.Due to the growing concerns that flood events will become more frequent, more severe and of longer duration, it is very important to better understand flood regime changes. Undeniably, natural variability plays a predominant role in flooding. However, the primary project objective will be to investigate if there is any climate change signal and to distinguish it from the noise, which is caused by the natural variability. The applicant will be embedded within the LBG Weather Modelling Team, and will interact with colleagues across the General Insurance area. This is to ensure that the outputs from the exercise are produced and framed appropriately to allow their use within insurance modelling frameworks for capital and pricing. Drawing on lessons learned from our KTP collaboration with the University of Reading on wind and flood correlations, ensuring that the applicant spends a significant portion of time co-located with the LBG team will be critical to the usability of the work.To investigate climate-change related impacts on inland flooding in the UK, the applicant will investigate trends in available instrument data:* The applicant will perform statistical analyses on historic flow records using river gauges covering the UK;
* The main data source proposed for use will be the National River Flow Archive, which manages a hydrometric network of over 1500 gauging stations, although alternatives will be considered as put forward by the candidate;

The statistical analyses on this data record will investigate the following:* Trend detection;
* Long-term memory processes driving clustering;
* Timing shifts;
* Relationship with climatic indices (e.g. NAO). Has the correlation with these indices changed?
* Spatial patterns of flood regime changes;
* Attribution studies.
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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| * Lloyds Banking Group (LBG) has experience in hosting academic researchers within its Weather Modelling Team. As part of a KTP programme (ending 2020) on wind and flood correlations with the University of Reading, a researcher has been based full-time at our Lovell Park location, whilst being employed by the University;
* The researcher would be based between the LBG Lovell Park location in Leeds, and their academic institution. The split would be negotiated depending on the candidate researchers’ individual circumstances, with an expectation that a minimum 25% of the project time would be onsite at LBG;
* (As per our KTP arrangements), LBG would provide desk space to host the researcher within the Weather Modelling Team. A company supervisor would be responsible for ensuring; successful integration of the researcher into the team; and project supervision, to ensure that work undertaken was relevant to the insurance modelling-related objective;
* The researcher would have access to teams across the General Insurance actuarial function, and meetings would be arranged as appropriate, to steer the work. Weekly interactions with the company supervisor, and the rest of the Weather Modelling team would be scheduled.
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| **Expected outputs & benefits for host organisation**  |
| Third-party probabilistic flood models form the basis of our quantification of flood risk for solvency and pricing purposes. These flood models are calibrated against historic flood activity and claims occurrence in the UK. By understanding (climate change-related) non-stationarity in the baseline used to develop these models, we can ensure that our view of risk is as accurate as it can be, and make potential adjustments to this view of risk to better capture this non-stationarity. The benefits of this for us as an organisation are:* **More accurate view of our solvency capital requirements**. We can ensure that our model, and in particular our view of potential large losses, captures flood risk as accurately as possible;
* **Ensuring sustainable pricing.** We can ensure that we are pricing risk in a sustainable way by capturing any trends that are identified through the work;
* **Informing our internal stress testing.** In 2019, LBG conducted climate change stress modelling for inland flood, as part of the PRA’s GI Stress Test. By understanding how the past change in climate has influenced flood risk, we can better develop our own internal view of how risk may change going forwards. This will support near-term planning;
* **Industry advocacy.** The issue of insuring high risk flood properties is a long-standing industry challenge that has led to the establishment of Flood Re, amongst other initiatives. Understanding the sensitivity of flood risk to climate change will help inform how the industry approaches this challenge. LBG is well placed to bring these research outputs into the industry conversation on high-risk flood properties, as an active participant in Flood Re, and a core part of these discussions;
* **Connection to the research community.** One key lesson learned from our KTP partnership with the University of Reading, is the value of the connection to the academic community in the UK for us as a business. As we look to develop new modelling methods to account for climate-related risks, it is within the research community that we will find the knowledge and information we need to develop the new techniques required. The insurance industry has a well-developed catastrophe risk modelling field, but for climate change, we need to cast the net wider, beyond the established techniques and existing datasets that support insurance modelling.
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| **Expected benefits for successful applicant**  |
| The successful applicant will benefit from the following:* Understanding of how insurers model risk, and how climate data can inform this;
* A dedicated project supervisor nominated from within the LBG weather modelling team to provide technical and mentoring support;
* Integration into the weather modelling team, including participation in team meetings;
* Opportunity to present the work across the business;
* Experience of working across academia and the private sector;

LBG has successful experience integrating researchers in this way into the team.  |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| LBG is one of the UK’s largest homeowner’s insurers representing around 10% of the national market and offering building and contents cover under its own brands, Halifax, Bank of Scotland and Lloyds Bank as well as underwriting white label insurance with corporate partners. LBG’s home insurance offerings protect millions of households in the UK against the financial impacts of severe weather. This protection is increasingly important, as the changing climate exacerbates weather risk in the UK, increasing the severity and frequency of impacts to households.LBG’s operations cover two of the core areas of the UK Climate Resilience programme: 1: Characterising and quantifying climate-related risks; and 2. Managing climate-related risks through adaptation **Characterising and quantifying climate-related risks** is critical for the LBG General Insurance business, from both a solvency, and pricing, perspective. Weather risk is the most significant component of the solvency capital requirement for LBG’s general insurance entities. Ensuring that the quantification of this risk appropriately considers how risk changes with the changing climate, is therefore key to LBG’s sustainable provision of protection to UK households. The appropriate capture of changing risk is similarly critical for LBG’s development of fair, sustainable and competitive pricing for its general insurance offerings. As any capture of increasing risk arising from a changing climate will cascade down into the cost of cover to UK households, the understanding of this change in risk is critical. It is fundamental to our responsibility for fair pricing, our aim to be the best bank for UK customers, and our ability to operate sustainably in a challenging market environment, (where the trend towards digitisation through insurance comparison websites is putting increasing pressure on profit margins per policy).In response to these challenges, LBG has an in-house Weather Modelling Team. The team was created in 2017, and has grown since inception, now comprising five staff with meteorological, hydrological, and catastrophe risk modelling backgrounds. This team is responsible for the internal view of weather risk for all aspects of the business. Through this team, and also prior to its inception, LBG has a history of partnering with academia on the quantification of weather-related risk. LBG co-sponsored a PhD student at the University of Reading, who completed work in 2017 on the impact of climate change and precipitation. A KTP project, also with the University of Reading, is currently underway with the LBG Weather Modelling Team. This project runs from 2018 to 2020 and looks at how the correlation between extreme flood and wind events could be captured within our capital modelling. Through its provision of insurance, LBG is contributing to the resilience of millions of UK households, helping them **manage climate-related risks through adaptation**. Further to insurance provision, LBG contributes to UK resilience through customer and industry initiatives. This includes initiatives such as our trauma helpline partnership with RedArc; a review of the risks of insuring modern methods of house construction; and also working with the ABI to progress the industry wide use of flood resilient features in “at-risk” properties. As an active participant in Flood Re, we support affordable premiums for customers, both through the current subsidised scheme for higher risk properties, and by supporting Flood Re’s objective to transition the market to affordable risk-reflective premiums. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Emily White | Senior Manager | Weather Modelling Team | Emily.White@lloydsbanking.com |
| Dimos Tsaknias | Manager | Weather Modelling Team | Dimosthenis.Tsaknias@lloydsbanking.com |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Flexible. Full-time equivalent estimate of between 75% and 100% of researcher time, to be split between Leeds and researcher academic institution as convenient. |

# **London Climate Change Partnership (1)**: “Monitoring adaptation in London – development of a limited set of adaptation indicators”

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| **Project title**  | Monitoring adaptation in London – development of a limited set of adaptation indicators |

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| **Organisation name**  |
| London Climate Change Partnership, London |

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| **Project and activities to be undertaken by successful applicant**  |
| 1. Work with LCCP manager and partners to identify a limited set of quantitative (and potentially qualitative) indicators for monitoring adaptation progress in London. This is not starting from scratch; an indicator framework and some suggested indicators have been developed. It will also require a review of existing monitoring systems (for example, the Sustainable Development Goals framework that the London Sustainable Development Commission is developing, or TfL’s data collection on performance) to find appropriate data that can be re-purposed.
2. Population of the indicators with available data and setting out information about trends (where possible), relevance of the indicator, source of data.

This project will not include a complete review of indicators and conclusions about London’s resilience based on this, as the scope and timeframe is limited. However, recommendations about that further work and how it might be undertaken would be welcome and potentially shape future research support.  |
| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Placement base will be in Greater London Authority, London and managed by Kristen Guida, LCCP Manager. Due to desk availability in the GLA, researcher is encouraged to work from home and join discussions and meetings as needed and agreed. Arrangements can also be made at partner organizations if needed.  |

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| **Expected outputs & benefits for host organisation**  |
| The LCCP is tasked by the GLA with monitoring how well London is adapting to climate change. Climate change adaptation indicators for London will help us develop London’s strategic adaptation policies. Because adaptation requires action and understanding across the range of sectors, and because the Mayor’s powers to prepare London for climate change are necessarily limited, indicators and monitoring should also be of interest to decision-makers in sectors and organizations responsible for adaptation planning. This includes boroughs, utilities and infrastructure providers, social service providers, the private sector, and those outside of London where decisions may affect or be affected by London. The purpose is to help London’s major decision-makers understand how well London is adapting to climate change and where to focus adaptation efforts. |

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| **Expected benefits for successful applicant**  |
| The researcher would have access to a wide range of stakeholders and the opportunity to take part in meetings and events to learn about decision-making and policy processes – as well as influence London’s adaptation priorities.  |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| LCCP is the centre for expertise on climate change adaptation and resilience to extreme weather in London. We are comprised of the major public, private, and community sector organisations that have a role to play in preparing London for extreme weather today and climate change in the future. Since 2001, we have brought together practitioners and policy makers with academic research to support better informed decision-making to make London resilient. Examples include leading ambitious policies in the London Plan related to heat and flood risk and adaptation retrofit guidance and practice.  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Kristen Guida | Manager | Environment  | Kristen.guida@london.gov.uk0207 983 5781 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August/September 2020 |
| **Duration of placement (months)** [no more than 12 months] | 6-12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | As suits researcher, can be flexible |

# **London Climate Change Partnership (2)**: ““RetroFit for the Future” evidence base and advice”

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| **Project title**  | “RetroFit for the Future” evidence base and advice  |

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| **Organisation name**  |
| London Climate Change Partnership, London |

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| **Project and activities to be undertaken by successful applicant**  |
| A literature review of research and guidance about residential retrofit addressing the impact of climate change including overheating, water security, flooding, air quality, ventilation, fuel poverty, energy efficiency, sustainability, thermal comfort, and health. This should also consider “ageing in place” principles aimed at ensuring the ability to live in one's own home safely, comfortably, and independently regardless of age, income, or ability level. It should also include consideration of occupant behaviour and social factors such as deprivation, isolation, challenges of accessing services, and poverty that increase the climate-related risks to occupants.Points of guidance/advice to inform a holistic, integrated approach to retrofitting /adapting existing homes/buildings. This should include: * + Things to consider when planning retrofit of existing homes (how to get the most out of retrofit, to ensure multiple benefits and avoid maladaptation)

Catalogue of measures/interventions, along with advice about suitability for particular purposes, how they may interact, the potential risks and benefits of each (or of combinations of them), costs, and considerations in implementation – principles for sequencing work, or where to get further advice)* + Good practice examples
	+ Recommendations for others (possibly policy makers, home owners, DIY shops) about how to support retrofit for a healthy home
	+ Funding streams (possibly)

Both elements would involve engagement with a range of stakeholders, but the development of integrated retrofit guidance recommendations especially so. The researcher would have support from the LCCP in convening a peer review group and convening discussions to capture feedback. The researcher would not be expected to design a guidance document, but the recommendations derived from the research should inform such a document in future.  |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Placement base will be in Greater London Authority, London and managed by Kristen Guida, LCCP Manager. Due to desk availability in the GLA, researcher is encouraged to work from home and join discussions and meetings as needed and agreed. Arrangements can also be made at partner organizations if needed.  |

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| **Expected outputs & benefits for host organisation** |
| The LCCP seeks to understand how existing homes can be made fit for the future, to ensure the health and wellbeing of occupants given the challenges of an ageing population, an increase in the number of single occupancies, people living longer with a number of diseases, where homes may have been poorly designed for future living, and where the use of building materials was not considered in the context of the impacts of climate change and longevity. We are also aware of the unintended consequences of “single issue” retrofit for energy efficiency, such as poor air quality and overheating. We would like to end up with: * A review of existing research and guidance on home retrofit that can inform the production of guidance to enable integrated retrofit that achieves, to the extent possible, the greatest range of potential benefits to health and wellbeing and sustainability—including thermal comfort, adequate ventilation, good air quality, energy and water efficiency, and sustainability—and which avoids unintended consequences such as overheating.
* Recommendations for a new piece of guidance to inform London’s retrofit programmes, but ideally with applicability across a range of places.
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| **Expected benefits for successful applicant**  |
| The researcher would have access to a wide range of stakeholders and the opportunity to directly influence London’s (and ideally beyond London’s) retrofit programmes to ensure resilience to climate change.  |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| LCCP is the centre for expertise on climate change adaptation and resilience to extreme weather in London. We are comprised of the major public, private, and community sector organisations that have a role to play in preparing London for extreme weather today and climate change in the future. Since 2001, we have brought together practitioners and policy makers with academic research to support better informed decision-making to make London resilient. Examples include leading ambitious policies in the London Plan related to heat and flood risk and adaptation retrofit guidance and practice.  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Kristen Guida | Manager | Environment  | Kristen.guida@london.gov.uk0207 983 5781 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August/September 2020 |
| **Duration of placement (months)** [no more than 12 months] | 6 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | As suits researcher, can be flexible |

# **Manchester Climate Change Agency:** “Sector-specific adaptation and resilience planning and action: Manchester Climate Change Partnership pilot”

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| **Project title**  | Sector-specific adaptation and resilience planning and action: Manchester Climate Change Partnership pilot  |

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| **Organisation name**  |
| Manchester Climate Change Agency |

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| **Project and activities to be undertaken by successful applicant**  |
| The embedded researcher will lead on the delivery of the outputs set out above. It is expected they will have access to previously completed adaptation and resilience research focused on the UK, Greater Manchester, Manchester, and/or the specific sectors identified in this bid.This project will enable the researcher to both undertake new research as well as support the translation of existing research into policy, sector/organisation plans, and advise on practical implementation. The researcher will work as Manchester Climate Change Agency’s ‘Resilience and Adaptation Lead’ for the duration of the 12-month project.Further, it is expected that this project will identify a need for the Agency to establish a longer-term role, beyond the life of this project. If this is found to be the case the Agency and the embedded researcher will aim to secure resources to enable the role / a similar role to be established.  |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The researcher will be hosted by Manchester Climate Change Agency and based at the Agency’s office in Manchester city centre, at 11 Ducie Street, M1 2JB.The researcher will report to the Programme Director, working as an embedded part of the Agency’s work programme (further details below).The researcher will be supported by the Programme Director through monthly one-to-one meetings and a six-monthly review of the placement and work programme. The Agency will also work with the researcher’s academic organisation to put in place a mechanism for regular researcher-university meetings and progress reviews.In the event that the researcher does not feel adequately supported they will have access to the Chair of the Agency’s Board of Directors and a relevant senior contact at the university (TBC).  |

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| **Expected outputs & benefits for host organisation**  |
| The Agency’s headline aim for this project is to put adaptation and resilience on the same footing as mitigation, in the city’s climate change policy and governance structures. The following outputs will be produced, to support the Agency with the further development and implementation of the Manchester Climate Change Framework 2020-25.**City-level objectives, targets and monitoring system**1. Risk and vulnerability assessment
2. Adaptation and resilience objectives and targets, for inclusion in Version 2.0 of the Manchester Climate Change Framework 2020-25
3. System for monitoring and reporting progress

**Strategy and governance:**1. Adaptation and resilience included in Version 2.0 of the Manchester Climate Change Framework 2020-25, for production during 2021/22
2. Manchester Adaptation and Resilience Advisory Group established to monitor progress against the objectives and targets, ensure they remain up-to-date in line with the latest science, and advise on actions the city and its organisations and citizen need to take

**Sector/organisation-level**1. Guidance document for organisations to undertake risk and vulnerability assessments, develop bespoke objectives and targets, and action plans. To be based on existing materials and signposting.
2. At least 4 sector/organisation-specific risk and vulnerability assessments
3. At least 4 sector/organisation-specific objectives, targets and action plans for adaptation and resilience

**Communications and reporting**1. At least 6 articles, case studies and other communications materials
2. Adaptation and resilience section of the Manchester Climate Change Annual Report 2021
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| **Expected benefits for successful applicant**  |
| The successful applicant will gain invaluable experience in supporting the achievement of city climate change objectives as well as personal and professional growth and development. Specific benefits are expected to include: * Experience of working at the interface between academic, policy and practice
* Experience of directly contributing to the development of a city climate change strategy
* Experience of operating within the local political process, working directly with senior politicians and officers at Manchester City Council, in order to directly inform the development of formal policy
* Experience of providing strategic and practical advice and support to private, public and community sector members of the Manchester Climate Change Partnership
* Experience of raising public awareness of the adaptation and resilience agenda in Manchester
* Experience of working with other UK and EU cities that Manchester collaborates with through, for example, the UK Core Cities, Eurocities, Cities with Nature, Covenant of Mayors, and others.
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| **Host organisation summary (including relevance to UK Climate Resilience programme** |
| Manchester Climate Change Agency was established in 2015 to drive forward climate change action in the city. The Agency’s work programme is focused on:1. **Setting climate change objectives and targets**, in line with the latest science and the Paris Agreement
2. Establishing the **strategy and governance** required to meet the objectives and targets
3. **Engaging and mobilising** organisations and citizens **to take action**
4. Honestly and transparently **communicating and reporting** progress

This project will work across all four workstreams.**1) City-level objectives and targets for adaptation and resilience**In November 2018 Manchester City Council set objectives and targets for the city to meet on carbon reduction. These were based on analysis by the Tyndall Centre for Climate Change Research at the University of Manchester, and recommendations put forward by the Manchester Climate Change Agency. Work is underway to review and refresh these targets, with a view to publication in February 2020 and presentation to Manchester City Council for formal adoption in March 2020. They will form part of the Manchester Climate Change Framework 2020-25, which will be published by Manchester Climate Change Agency on 28th February 2020.This project will replicate this approach, to establish science-based objectives and targets for Manchester on adaptation and resilience, for inclusion in a refreshed version of the Framework in 2021/22. **2) City-level strategy and governance**The Framework’s timescale is the next five years, to focus organisations and citizens on taking urgent action, and to put the city on course for its longer term commitments (including staying within a 15m tonne carbon budget for 2018-2100 and becoming zero carbon by 2038, at the latest).Version 1.0 of the Framework will be more focused on the city’s zero carbon objective, due in-part to the Agency’s current levels of technical capacity. This project will enable the adaptation and resilience aspects of the Framework (and the interrelationship with the mitigation aspects) to be further developed, for inclusion in Version 2.0. **3) Sector and organisation-level plans and action: Manchester Climate Change Partnership**Manchester Climate Change Partnership was established to help the city meet its climate change targets. It is currently made up of 60 organisations from across 10 sectors, with collective responsibility for over 20% of Manchester’s direct CO2 emissions.Following on from the setting of city-level science-based carbon reduction targets in November 2018, Partnership members are developing bespoke sector/organisation-level targets and action plans, currently focused mainly on carbon reduction.This project will replicate this approach, supporting members of the Partnership to develop commitments and plans for adaptation and resilience, and build the necessary in-house capacity for their delivery. **4) Communicating and Reporting Progress**Manchester Climate Change Agency publishes ongoing materials to update the city in relation to its climate change targets.This project will produce web-articles, case studies and other materials to update the city (and beyond) on adaptation and resilience work, and produce the adaptation and resilience section of the Manchester Climate Change Annual Report 2021. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Jonny Sadler | Programme Director | N/A | jonny.sadler@manchesterclimate.com0757 2541 9150 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | 3rd August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full time |

# **Marine Management organisation**:“Climate Smart Marine Planning and Licensing”

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| **Project title**  | Climate Smart Marine Planning and Licensing  |

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| **Organisation name**  |
| Marine Management Organisation (MMO) |

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| **Project and activities to be undertaken by successful applicant**  |
| This proposal will focus on co-exploring and connecting existing knowledge and sharing lessons about adaptation practice to more robustly produce evidence led marine plan and planning processesMMO works within both Agile and Waterfall project management approaches. The MMO proposes Agile practices for this work. Agile projects are completed in steps seeking useful products and providing feedback at each step. Insights gained from previous steps are used to guide following steps. Agile project management approaches are more suitable for working under uncertainty, banking usable outcomes and incrementally delivering. Contingency is obtained through clear prioritisation of activities e.g. dropping some “nice to haves”. This approach is particularly suited to the time and cost fixed nature of the embedding scheme and opportunities (e.g. decisions relating to East Plan amendment, EU Exit negotiations, emerging national policy) and will allow researchers to follow productive avenues of investigation within the context of the work. The following work-packages are proposedWP1 – Focuses on project inception covering; **Induction** to MMO Health and safety, IT set-up, institutional introductions and overview from MMO functions; **Familiarisation** with marine planning and licencing, key document review; **Planning**; proposal refinements, contextual and unpublished progress updates, ways of working, data needs, training/mentoring plan etc. WP2 **– Evaluating current status of climate change policy in marine planning**. Taking the latest (2020) tranche of marine plans as baseline, this project will identify areas of unfulfilled potential the following questions.* How effective are marine plan and policies expected to be in building resilience, accelerating adaptation, mitigating impacts and capitalising on potential opportunities of climate variability and change?
* Does climate change require additional considerations to be interested into marine planning or do existing approaches, principles or frameworks like ecosystem approaches, natural capital, precautionary principles and net gain satisfy requirements?
* Can climate change be better addressed in the next iteration of marine plan content and the planning processes and if so how might this be done.

WP3 – **Identifying emerging issues and evidence**. The researcher will provide insight and expertise to access and interpret recent science advances, sectoral risk assessments and adaptation strategies and Environmental Impact Assessment to establish plan area issues and potential planning interventions. Activity in this work package seeks to answer the following * What advances in practice or understanding climate change risks have been made since 2014 (adoption of the first marine plans), particularly with regard to marine and coastal areas, regional differentiation and certainty?
* How do marine and marine dependant sectors seek to adapt to climate change and variability, and are there common adaptation strategies among sectors

WP4 - **Climate considerate marine licensing**: This work explore the implementation of plan policy and wider climate relevant legislation through MMO licensing decisions and the opportunities and barriers to more ambitious policymaking. Marine licence applications are assessed so that likely impacts of the proposed activities are understood and must be taken in accordance with marine plans or state the reasons for not doing so. However marine plans are strategic documents. Licence decisions are made at site specific assessments scales. What implementation challenges exist? Environmental Impact Assessment (EIA) must also consider the likely significant effects of the project on climate and the vulnerability of the project to climate change” although not all proposals require an EIA. Proposal are also subject to assessment of likely significant effects on marine protected areas and attainment of Water Framework Directive and Marine Strategy Framework Directive (as transposed) goals. WP5 – **Supporting climate smart marine plans.** This work package has some dependency on the outputs of WP2-4, drawing together evaluation of planning action and implementation to date and exploration of the emerging future opportunities and challenges. This WP is to make recommendations to MMO that support climate smart plans. There would be the opportunity to progress several prioritised actions. These may potentially include, but are not limited to * identifying or enhancing frameworks or processes,
* addressing evidence or data gaps
* building collaborations or undertaking engagement
* drafting potential policy intervention options
* developing climate policy impact monitoring and evaluation

WP6 – Closeout: **Completion** including collation and handover of final materials, sharing lessons, leavers administration. **Dissemination** within MMO, Defra family and the programme; **Future** including timelines of MMO implementation of placement activities, researcher activities beyond embedding and building the collaboration.  |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| **Location:** MMO Main Office (Newcastle) preferred. Other Defra Group locations will be considered subject to capacity. **Hosting:** Researcher will be line-managed by Head of Evidence and embedded day to day within the Evidence Team. If not working from Newcastle, MMO has the facilities to enable distributed working.**Support:** The researcher will benefit from supporting project group with representation from end user teams (Marine Planning and Licensing) and relevant support functions (Evidence, Data/GIS, Statistics) to facilitate activities. Relevant MMO and MMO licensed data, archives and sensitive material would be available for use through embedded status (e.g. data or developing policy). Up £2000 would be available to support engagement travel and subsistence (e.g. for travel to Defra (London) or around England for plan area engagement or for meetings with industry). While embedded, the researchers would be encouraged to experience MMO ways of working including flexible working. The MMO is open to continuing interaction beyond the embedding timeframe to maximise project impact and future opportunities. |

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| **Expected outputs & benefits for host organisation**  |
| Embedded researchers will support planning and licensing life cycle analysis in relation to climate risk and adaptation to inform the iterative development of England’s marine plans and the plan led licensing decision making process. The MMO is making marine plans across eleven marine plan areas. Development of marine plans in England has been a phased and iterative process. As such individual plans are at different stages in the planning cycle and researcher activity will contribute to several phases of marine planning within the embedding time line with benefits accruing quickly. Broadly, the marine planning cycle encompasses i) issues and evidence gathering, ii) consideration of interventions, iii) policy response development, iv) plan adoption process, v) internal and external decision-makers, vi) evaluation with potential amendment (new cycle) including outcomes of evaluation and new issues and evidence under i). Expected outputs reflect planning phases and are; 1. Review of climate change consideration in marine planning process and existing plan policy (phase vi)
2. Emerging issues and evidence (phase i)
3. Developing new climate smart marine plans intervention options (phase ii, iii)
4. Climate considerate marine licensing (phase v)

Outputs are expected to contribute to the following* At this time the second Three-Yearly Report for the adopted East Marine Plans is due to be laid before Parliament. A decision will be made by the Secretary of State in mid-2020 whether to amend or replace the East Marine Plans. If plans are to be amended/replaced a new planning cycle will commence. the researcher will be critical in progressing identification new issues, evidence and possible interventions for the next plan cycle
* The South Marine Plans were adopted in July 2018. Policy is currently being implemented and the plan will be due for the first 3-yearly Report by July 2021. Researchers will contribute to monitoring indicators and approach to assess the effectiveness and appropriateness of existing climate change policies
* The Draft NE,NW,SE, and SW Marine Plans are currently undergoing public consultation with final submission to Government expected in Autumn 2020. These plans represent the new baseline for marine plans and specific focus will be on plan policy implementation and developing longer term actions evidence needs from these plans forward.
* With all plan areas having either adopted or draft marine plans, plan policy is part of decision making in the marine area. Exploration of ongoing implementation will inform in the success plan policy implementation and barriers and opportunities to more ambitious or implementable policy.

As well as benefits from the contribution to plan products, the MMO envision the following benefits**Builds capacity:** The MMO will seek knowledge exchange opportunities between the researcher and key individuals to build capacity in MMO on consideration of climate. **Access novel skill set:** Researchers will bring a novel skill set with them outside of their climate specific technical expertise. Teams gain strength in diversity and MMO would seek to maximise insights from wider analytical skills e.g. statistical modelling, discourse analysis etc. that MMO may reapply in other business aspects.  |

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| **Expected benefits for successful applicant**  |
| **Short route to meaningful impact**: This is a valuable opportunity to bring your expertise, experience and research has the opportunity to influence strategic marine plan policy and decision making frameworks at a crucial time in the UKs response to the climate crisis. **Regulatory and governance insight**: Embedding will provide you with valuable insight into the policymaking process, particularly how research is used to inform decisions. Existing governance structures, and regulatory practices establish goals and mediate behaviours of individuals and organisations in relation to climate change. Research recommendations are likely to be more quickly or comprehensively valued and incorporated where they are practical and implementable drawn from those familiar with, and able to act within, existing structures or where unsuitable may be identified from an informed position. **Diverse stakeholder and government engagement:** Both marine planning and climate change mitigation are topics that span academic disciplines, sectors and organisations. The researcher will, through the marine planning process, have the opportunity to interact with diverse stakeholder groups drawing the MMO extensive network of contacts and well-refined engagement and participation processes. The embedded research will have opportunity to participate in appropriate evidence platforms with the MMO e.g. MCCIP, Impacts Evidence Group as appropriate. Working directly with planning, licensing and evidence teams gives you opportunity to build a network of policy and evidence contacts and work in an interdisciplinary environment that can be accessed beyond the time period of embedding.**Access to unique resources:** As the authority responsible for marine planning and licensing, the MMO can support the project with a range of data and information sources not publicly available, including for example draft plan policy or consultation responses that present unique opportunities. **Training/Mentoring:** It is likely that you will encounter confidential information. Training will be required to ensure that such sensitive documents and information remain secure. You will need to undertake a short online course for managing sensitive data or have proof of equivalence. The MMO seeks candidates that can bring expertise in climate science or climate risk assessment and mitigation. The MMO can support researchers with in-role training and mentoring depending on their skill set, interest and aspirations. Training including might include tools like project management, analytical approaches e.g. GIS, policy and legislation or outside of traditional disciplines.**Transferable Skills:** Whether you’re interested in a policy, research or alternative career path, the embedding will develop your transferrable skills in project leadership, systematic review methods, communicating complex information to non-experts, writing for a policy audience, working at pace, and balancing needs of policy and evidence.  |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| The MMO is an executive Non-Departmental Public Body of the Department for Environment, Food and Rural Affairs created by the Marine and Coastal Access Act (2009). The MMO plan license and regulate marine activities in the seas around England to ensure they are carried out in a sustainable way. This helps the government achieve its vision for clean, healthy, safe, productive and biologically diverse oceans and seas. MMO is an organisation of approximately 300 people combining the main office in Newcastle, with operations in London and a local offices around the English coastline.Responsibilities of the MMO include • managing and monitoring fishing fleet sizes and quotas for catches• ensuring compliance with fisheries regulations, such as fishing vessel licences, time at sea and quotas for fish and seafood• helping to prevent illegal, unregulated and unreported fishing worldwide• managing funding programmes for fisheries activities• dealing with marine pollution emergencies, including oil spills• making marine nature conservation byelaws• enforcing wildlife legislation and issuing wildlife licences• planning and licensing for marine construction, deposits and dredging that may have an environmental, economic or social impact• producing marine plans for English waters to include all marine activities, including those MMO don’t directly regulateThis proposal supports MMO’s marine planning and licensing functions. Marine Plans introduces a strategic approach to planning within English inshore and offshore waters and applies national policies in a local context, enabling activities to occur in the right place, at the right time, and in the right way. The [Marine Policy Statement](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf) (MPS) provides a framework for preparing marine plans and taking decisions affecting the marine environment. Marine plans are driven a means to deliver government’s High Level Marine Objectives from the MPS including “use of the marine environment is benefiting society as a whole, contributing to resilient and cohesive communities that can adapt to coastal erosion and flood risk” and " the marine environment plays an important role in mitigating climate change” “The use of the marine environment is spatially planned … takes account of climate change” The MMO thus ensures that we optimise use of the marine area’s natural capital, realising greater protection of vulnerable habitats and species, and natural defences against climate change and flooding, as well as improving the well-being of coastal communities and supporting a stronger marine economy.Many activities that take place in and around the sea (up to mean high water spring) require a range of consents issued by various decision-makers, including a marine licence issued by the MMO. Licences are required for including construction, dredging, or deposit / removal of any substance on the seabed. This encompasses a wide range of climate adaptation works from renewable energy or carbon capture infrastructure to habitat creation. As such MMO is at the forefront of implementing actions to **manage climate risks, facilitate UK adaptation,** and **avoided losses** in the marine environment.MMO is responsible for licensing activities maximise opportunity from a changing climate including for example aquaculture of new species ensuring **contribution to UK Plc.** |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Dr Aisling Lannin | Head of Evidence | MMO Evidence Team (Business Transformation Directorate) | evidence@marinemanagement.org.uk |
| Dr Christopher Sweeting | Senior Evidence Specialist | MMO Evidence Team (Business Transformation Directorate) | christopher.sweeting@ marinemanagement.org.uk |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 to March 2021 |
| **Duration of placement (months)** [no more than 12 months] | 6-9 months over the 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Flexible schedule including full time or part time (down to 50% for 12months) welcome. |

# **Mott MacDonald**: “Industry practice in assessing climate risk: survey, capture and dissemination”

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| **Project title** | Industry practice in assessing climate risk: survey, capture and dissemination |

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| **Organisation name** |
| Mott MacDonald |

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| **Project and activities to be undertaken by successful applicant** |
| The aim of this collaboration between the embedded researcher and host institution is to bring closer the understanding and description of risk in academic theory with how risk is quantified and used in practice. It will also offer the opportunity to apply and evaluate emerging risk metrics in partnership with relevant stakeholders that are able to better represent the dynamic nature of risk, e.g. changes in the nature of hazards and physical exposure, including changes to contextual settings that may influence the decision-making process and identification of climate services that provide guidance in decision-making. To achieve this aim, the following objectives are pursued:1. survey of risk assessment approaches and methods in industry contracts: the embeddedresearcher will have access to a wide selection of internal reports and material thatdemonstrates how climate risk is understood and captured in the construction industry.Complementing the survey of grey literature, the embedded researcher will conductinterviews with Mott MacDonald staff, and when appropriate their clients, to clarify themotivation for method choices and understanding of the value and relevance of capturingclimate risk in operational risk assessments,2. alignment of current practice with current government policy: the embedded researcher willlook at the information gathered on industry practice and assess alignment with currentgovernment policy,3. survey of use and understanding of strengths/limitations of climate change information (e.g.UKCP09/18, other): the embedded researcher will consider the use of climate changeinformation in risk assessments from the perspective of application-relevance and scientificrobustness,4. in collaboration with relevant stakeholder, identify sector-representative case studies to applyand evaluate climate risk metrics that account for the dynamic aspects of risk elements andtheir internal interaction,5. co-production of internal and external position papers, research papers, graphical outreachmaterial with relevant industry partners: in discussion with relevant co-authors, the embeddedresearcher will distil knowledge gained from this project and place in context with the evolvingdiscourse on climate risk in the international research community. Insights, lessons andrecommendations will be communicated using a range of different outlets relevant to targetedaudiences. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The embedded researcher will be managed directly by the Global head of Climate Science who will be responsible for drawing in the wider global networks of Mott MacDonald. The post will be based in Mott MacDonald’s Cardiff or Cambridge Office (depending upon who the successful candidate is). At either location a named member of staff (Simon Power based in Cardiff and Kiki Pattenden based in Cambridge) will be responsible for ensuring that the embedded researcher is engaged with colleagues in Mott MacDonald and day to day administrative and work schedules are organised and facilities made available. The embedded researcher will be strongly encouraged to participate in relevant business activities and Mott MacDonald’s extensive UK and global Climate Change Networks. |

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| **Expected outputs & benefits for host organisation** |
| This scheme will help Mott MacDonald increase our knowledge of climate change risk and resilience which will benefit our UK and global client base thus helping the UK economy directly. Mott MacDonald has a demonstrable presence and inclusivity in sharing key developments across the wider community through engagement in professional associations. Hosting this post will help provide the following benefits:• capacity building for industry colleagues across all of the sectors in which we work,• increased knowledge and use of UKCP18 data, especially in the context of extreme eventanalysis for managing climate risk,• development of a comprehensive framework for assessing and managing climate risk andbuilding resilience that can become a global benchmark,• gather information about stakeholder practise to consider climate risks in consultancy sector,information that supports the activities of the UK Climate Resilience programme and champion(e.g. to support the development of sector-specific climate services).The following outputs will be seen as a pre-requisite for success:• internal position papers on best-practice approaches to identify and quantify climate changerisk,• research papers capturing the approaches and metrics used to quantify and communicateclimate risk in the consultancy sector, drawing on Mott Macdonald’s projects as case studiesand context setting,• conference, workshop and symposium presentations to disseminate knowledge about howclimate risk is accounted for in operational risk assessments,• a private sector focussed workshop that will highlight the results of this project and the role ofthe UK Climate Resilience Programme and Champion,• external position papers for our stakeholders and clients that will help increase theunderstanding of climate risk in a dynamic and evolving context.Mott MacDonald has provided informal support, assistance and advice to numerous NERC projects, this activity will allow us to consolidate that work and provide more tacit and demonstrable support. |

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| **Expected benefits for successful applicant** |
| This project offers a unique opportunity for an academic researcher to familiarise themselves with how climate risk is understood and assessed by the practitioner’s community, specifically in the construction and water industry. The embedded researcher will be immersed in the organisation, having designated contacts that provide practical support and facilitate completion of stated objectives. In addition to exposure to the Mott MacDonald client base, the researcher will have access to leading global institutions and organisations that influence the international discourse on climate risk.Through participating in this project, the researcher will have an opportunity to establish a personal network with industry stakeholders. This network is valuable as such contacts can provide meaningful support and input when developing future research proposals. In addition to such long-term benefits, by participating in this project, the researcher is given an opportunity to develop, apply and evaluate their own understandings of climate risk and associated methods and approaches. Through access to internal reports, an international client base and industry networks (e.g., ICE, CIWEM, GBC etc.), the researcher will be provided with an exceptionally valuable opportunity to capture how climate risk is captured in the grey literature which otherwise would be difficult due to client-privileges often hampering access to such assessment. By being embedded within the contractor, and only reporting on summative conclusions from client information, the researcher is gaining access to an otherwise highly restricted information source. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The embedded researcher will be managed directly by the Global head of Climate Science who will be responsible for drawing in the wider global networks of Mott MacDonald. The post will be based in Mott MacDonald’s Cardiff or Cambridge Office (depending upon who the successful candidate is). At either location a named member of staff (Simon Power based in Cardiff and Kiki Pattenden based in Cambridge) will be responsible for ensuring that the embedded researcher is engaged with colleagues in Mott MacDonald and day to day administrative and work schedules are organised and facilities made available. The embedded researcher will be strongly encouraged to participate in relevant. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Professor DavidViner | Global Head –Climate Science | Global | David.viner@mottmac.com  |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | September 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Flexible - Planned for three 3 monthblocks across the 12monthperiod. |

# **Northern Ireland Department of Agriculture, Environment and Rural Affairs**: “Exploring opportunities for the use of blue carbon ecosystems as adaption solutions for the management of climate risks”

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| **Organisation name**  |
| Marine and Fisheries DivisionDepartment of Agriculture, Environment and Rural Affairs (DAERA)Klondyke Building, Cromac Avenue, Gasworks Business Park, Belfast, BT7 2JA |

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| **Project title**  | Exploring opportunities for the use of blue carbon ecosystems as adaption solutions for the management of climate risks |

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| **Project and activities to be undertaken by successful applicant**  |
| The primary focus of this project will be on blue carbon ecosystems and how they can be an effective measure to mitigate against climate change. Within Northern Ireland we need to be better equipped with adaptation measures as we face serious challenges from climate change – a fuller understanding and awareness of blue carbon is a critical way of taking this forward. Through this project the presence and extent of blue carbon in Northern Ireland will be explored, by analysis of historical and contemporary surveys. The successful applicant will explore opportunities to extend these ecosystems and demonstrate how such ecosystems are paramount to providing climate change resilience. For the first part of the project the successful applicant with review and assess the existing blue carbon ecosystems around the Northern Ireland coastline. This will primarily concentrate on salt marsh, seagrass beds and kelp forests. The applicant will collate all previous surveys of blue carbon ecosystems which have been carried out within the Department. In the analysis of this historical data the applicant will be able to collaborate with other relevant teams within the Department who may have carried out survey work at the relevant sites. Furthermore, the applicant will be able to avail of previous condition assessment reports which were completed for Habitats Directive Article 6 reporting, where seagrass beds or saltmarsh were a site selection feature of a *Natura 2000* site.In addition to the historical analysis, primary research will require a contemporary survey to be undertaken. Fieldwork will be carried out to map current presence and extent of blue carbon ecosystems around the coast of Northern Ireland. The Department is currently looking at commissioning a LiDAR survey for the Northern Ireland coastline, if this data is available at the time of this research then it can be used for analysis. In addition to gaining a quantitative analysis of the extent of such habitats, there will also be a requirement to assess the current condition of the blue carbon habitats present. In order to complete this contemporary aspect of the project, the applicant will be able to collaborate with other teams within the Department who may be doing survey work in these areas. Technology to carry out this survey work will be available from the Department. Once historical and contemporary surveys have been collated, data can then be analysed. This analysis would provide evidence of how blue carbon ecosystems are changing and where vulnerable and priority areas are located around the coastline.In order to assess the impact of climate change, most notably sea level rise, current areas of blue carbon will be modelled with future sea level predications so assess impact and most vulnerable sites. This research will identify where adaptation may be required and where building climate resilience may be paramount.Based on research carried out and the sea level rise predictions, the applicant will identify key blue carbon sites for restoration and propose suitable sites where blue carbon ecosystems could be extended or created. The benefits of restoring and extending blue carbon ecosystems are multiple. As previously stated, in addition to providing carbon storage, blue carbon ecosystems offer habitat protection, improve biodiversity, and offer protection for infrastructure and buildings. Overall, benefits spread across a broad range of sectors. The latter part of this project will be to research linkages across these sectors and to strengthen networks, providing a better understanding and awareness of the benefits of blue carbon restoration and extension. It is expected that with better research and education all sectors will fully understand how investment in these blue carbon ecosystems can supply numerous critical ecosystem services and how they have the potential to play a key role in climate mitigation and adaptation. The successful applicant will help in building these connections and play a key role in bridging between the sectors.Unfortunately to-date within Northern Ireland this research is fragmented and the linkages are not fully understood. It is anticipated that this project would deliver robust and multi-disciplinary research, ensuring Northern Ireland is more resilient to climate change and more powerfully equipped to adapt to the future ahead. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The location of placement with be at the Marine and Fisheries Division (DAERA) which is in Belfast. The successful applicant will be managed by a member of staff from the Division and support and assistance will be available. For practical aspects of the research, the successful applicant will have the opportunity to undertake field visits with other relevant teams from the Division. Technology to carry out the primary research will be made available to the applicant. |

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| **Expected outputs & benefits for host organisation**  |
| In recent years there has been global recognition of the importance and benefits which emanate from blue carbon ecosystems. Such ecosystems are increasingly recognised as providing climate mitigation services because of their effectiveness at sequestering and storing carbon. Within Northern Ireland we currently face serious challenges from climate change and research and findings from this project will inform policy development relating to the management of climate risks and coastal change, and contribute towards targets which must be met in order to address our current state of climate emergency.It is expected that findings from this project will raise the importance of blue carbon ecosystems within Northern Ireland; demonstrating how such ecosystems can contribute to climate change mitigation and resilience. Primary research on the current extent of blue carbon and where restoration and extension of such habitats could take place is expected. Having a better understanding of how we can increase our carbon storage in Northern Ireland will be a key output from this research.In addition to the carbon offset opportunities, there will be multiple other disciplinary benefits from this project, both to the Department and wider afield. For example, such ecosystems improve water quality, provide coastal protection and benefit coastal communities. Research will therefore provide solutions for adaptation, ensuring Northern Ireland is more resilient to climate change. According to the Intergovernmental Panel on Climate Change (IPCC, 2018) there is currently an urgent need for countries to build resilience and accelerate adaption to climate change. The IPCC state that developing our understanding and knowledge of blue carbon is one means of how we can achieve this in Northern Ireland and as recommended by CCRA17 it will improve the UK GHG inventoryMore specifically an expected output from this project is a better understanding and awareness of how blue carbon ecosystems can act as a form of natural coastal protection. Such ecosystems have the ability to reduce coastal flooding and erosion. In turn this will then increase the security and future for coastal communities, which may be threatened by climate change, most notably sea level rise and increased storm events. Such adaptation is paramount to improve the coast’s resilience to sea level rise. Research has indicated elsewhere in the world that there is a stronglinkage between preserving or coastline and climate change; it is hoped this innovative research will progress this linkage in Northern Ireland. A Coastal Forum was set up in Northern Ireland in 2015 to take forward management of our coastal environment. This work will contribute to that.Finally, output from this project will directly benefit central government as it will contribute towards future policy and management actions relating to climate change mitigation. Findings from this research will also inform future designation of protected sites, as it will identify key blue carbon sites which should be afforded designation. Overall within government there is an urgent need to build resilience and accelerate adaptation to climate change and research of blue carbon is one means of taking this forward. |

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| **Expected benefits for successful applicant**  |
| By spending time within a central government department, the successful applicant will gain an insight into the day-to-day working, drivers, decision-making contexts and knowledge needs of the Department. Due to the multi-disciplinary nature of the project, the researcher will have the opportunity to gather relevant primary data and information in this field. They will have the opportunity to work collaboratively with other partners increasing knowledge and findings in this work area. Within DAERA the successful applicant will have the opportunity to work within several teams in the Marine and Fisheries Division, which each have varying roles and responsibilities. For example, the applicant can liaise with the intertidal ecology team, who are responsible for sub-tidal sea grass surveys and kelp surveys around the Northern Ireland coast. Opportunities will be provided for the applicant to carry out survey work with this team and to avail of previous survey results.Due to the benefits blue carbon will have for natural coastal protection, the successful applicant will also have the opportunity to attend and contribute to the Northern Ireland Coastal Forum and the associated working groups. These groups include representation from government departments, local councils, the National Trust, Geological Survey Northern Ireland and the University of Ulster. Research from this project will align with the work programme for the Forum and the applicant will have the opportunity to contribute to the relevant work packages.A member of staff from the Department will be appointed to oversee the management of this project and to provide advice and guidance to the successful applicant. They will not be working in isolation but will be very much part of a multidisciplinary team. The applicant will be mentored throughout and will hopefully gain a wealth of experience, in addition to having the opportunity to undertake and innovative and exciting project. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| DAERA is required by the Climate Change Act 2008 to develop a Climate Change Adaptation Programme and the current programme is for the period 2019-2024. The actions identified in the programme are in response to the risks identified in the Climate Change Risk Assessment 2017 (CCRA17). CCRA17 identified risks to coastal communities, infrastructure, habitats and heritage from coastal erosion, storms and sea-level rise, and the Climate Change Adaption Programme 2019-2024 has the following outcome objective to manage these risks:Natural Capital Outcome 2: We have coastal communities, habitats, landforms and infrastructure that are resilient to impacts of climate change.The CCRA17 report identified that coastal erosion may be exacerbated by rising sea levels, higher wave heights and more extreme storm surge events. However, the nature and scale of the issues arising from coastal erosion in Northern Ireland are currently not definitively known. This knowledge gap has occurred because there is no Northern Ireland legislation for coastal erosion risk management that is equivalent to the Coastal Protection Act 1949. As a result, no Department has specific responsibility for managing coastal change and there is no mechanism for developing plans for managing coastal change, such as Shoreline Management Plans.This legislative gap is acknowledged by the Northern Ireland Departments and DAERA is working collaboratively with the Department for Infrastructure, local councils and the National Trust through the Coastal Forum to improve the evidence base and make recommendations for future policy and legislation options. To date, hard engineering has been considered the only solution to managing coastal erosion but it widely accepted that this requires frequent expensive repairs and often create further problems along the coast. The embedded researcher would contribute to the work of the Northern Ireland Coastal Forum and the development of policy options, with a particular focus on the development of a system for managing climate change risks at the coast through nature based solutions.Blue carbon is increasingly being seen as a tool for climate change mitigation and adaptation. It encompasses intertidal and shallow water environments such as vegetated coastal ecosystems (sea grasses, tidal marshes and kelp forests). Such ecosystems are highly efficient at carbon sequestration, capable of storing huge amounts of carbon in their plants and soil. It is reported that blue carbon ecosystems have the potential to sequester ten times more carbon per area unit than terrestrial systems. However, CCRA 17 advises that blue carbon habitats are not accounted for in the UK Greenhouse Gas (GHG) Inventory. Furthermore blue carbon ecosystems act as natural coastal protection, dissipating and absorbing wave energy, enhancing resilience to climate change. This in turn has benefits for vulnerable coastal communities. The scope of this project aligns with the UK Climate Resilience programme objectives and will support the Northern Ireland Executive and local councils to develop the necessary measures to improve climate resilience for coastal communities and infrastructure.  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Mr Colin Armstrong | Principal Scientific Officer | Marine and Fisheries Division, Department of Agriculture, Environment and Rural Affairs | Tel: 02890 569235Email: colin.armstrong@daera-ni.gov.uk |
| Dr Joanne Hanna | Marine and Coastal Geomorphologist | Marine and Fisheries Division, Department of Agriculture, Environment and Rural Affairs | Tel: 02890 569222Email: joanne.hanna@daera-ni.gov.uk |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | September 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Within the Department office hours are Monday – Friday, however, the working pattern of the placement will be flexible and negotiated between the researcher and the Department as appropriate. While it is understood time will need to be spent in the research institution, it is expected that a significant portion of the time will be spent working in the Department. |

# **Public Health England**: “High impact weather and public health - increasing healthcare climate resilience and protecting health”

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| **Project title**  | High impact weather and public health - increasing healthcare climate resilience and protecting health |

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| **Organisation name**  |
| Extreme Events and Health Protection, Public Health England |

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| **Project and activities to be undertaken by successful applicant**  |
| The researcher will support the development of an updated alerting system for heatwave and cold weather in England (the precise form of this new system is to be determined, in collaboration with the Met Office) and undertake activities to support the wider goal to develop an adverse weather and health plan.Depending on the interests of the applicant, a research plan will be co-produced with the team to complement the embedded researchers’ existing expertise and to address the research gaps identified as the work progresses up to the start date of August 3rd 2020. Initial exploration of the options to develop a new system has already highlighted two programmes of work that lend themselves to the goals of the embedded researcher call, for example;1. Assess meteorological and epidemiological data to explore options to improve the utility of the heatwave and cold weather alerting systems.

Exploring options for implementation of an impact-based forecasting system including the utility of a dual system for extreme temperatures as well as more moderate temperatures, taking account of population vulnerabilities and impacts at the different temperature thresholds, and the requirement to communicate effectively at different levels and to a range of different audiences (i.e. health and social care professionals, responder community, members of the public). This aspect would require working across meteorological, epidemiological and health stakeholders, as well as the those involved in wider resilience activities. 1. Development of Met Office services for front line health and social care professionals to protect health now and in the future.

Exploring opportunities for co-producing innovative met-health services, linking meteorological data via the Met Office Weather Datahub to personalised health services to support frontline health and social care staff or to support vulnerable people to live independently. This would include strengthening networks and brokering across meteorological and healthcare, voluntary and social care sectors to assess the potential for meteorological data to support innovation in existing and emerging health technologies, such as [predictive prevention](https://publichealthmatters.blog.gov.uk/2018/11/20/predictive-prevention-and-the-drive-for-precision-public-health/) (1) and technology enabled care services ([TECS](https://www.england.nhs.uk/tecs/)). The potential of big data and digital health is beginning to be explored but will increase in importance due to our [ageing population](https://www.ageing.ox.ac.uk/files/Future_of_Ageing_Report.pdf) (2), the shift to supported community care and an increasing prevalence of cognitive deficit related to dementia and Alzheimer’s disease . The co-produced Met Office services could be tailored to frontline healthcare professionals and individuals with defined risk factors.The two programmes of work above would develop shared learning and it is for this reason the Extreme Events and Health Protection Team have applied for two embedded researcher placements. However, each project could be undertaken as a standalone piece of research. PHE is able to tailor the specifics of the programme of work according to the researcher’s skills and the urgency of the output.There is work already underway to review the current alerting system, which will likely highlight other research gaps. It will also be possible to design a project around one or more of these emerging gaps as aligned with the skills and expertise of the successful applicant, and it would be premature to be more prescriptive about the project and activities, given the focus of this call on co-production. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Location - PHE Headquarters, Wellington House, 133-155 Waterloo Road, London, SE1 8UG.Extreme Events and Health Protection EEHP are experienced at hosting and supervising external researchers (e.g. postgraduate researchers from Imperial College London and LSHTM). The team is also a recognised national treasure placement under the Faculty of Public Health (FPH), with a FPH accredited Educational Supervisor in post, usually hosting one or more Speciality Registrars on the NHS Public Health Speciality Training Programme. The team has significant skills in public health, epidemiology and emergency response, however, meteorological skills are largely self-taught and accessed through brokerage and liaison with the Met Office.The researchers will undergo a full induction with EEHP and be supervised by one or more of the three senior managers within the team who will act as their key link within the organisation. The researchers will be supported by their key PHE link to co-produce the detailed research proposal, working with other members of the team as determined by the nature of the project as it takes shape. The researchers will also be offered day-to-day support by one of the team’s scientists and will sit alongside the rest of the team when not at their academic host institution. This will support their integration into the team as well an understanding of PHE organisational culture, as a significant number of PHE corporate functions are co-located.The researchers will also be encouraged to engage with wider team activities (team meetings, project meetings, etc) to support their understanding of the remit and functions of the team, and how these relate to their own project. Where appropriate, the researchers will be invited to internal PHE meetings as well as cross government meetings relevant to the programme of work.  |

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| **Expected outputs & benefits for host organisation**  |
| The evidence required to support the delivery of an updated alerting system and to support the wider aspirations of the adverse weather and health plan is complex and cuts across multiple disciplines including epidemiology, meteorology, healthcare public health, and behaviour change. PHE will benefit from the expertise of the embedded research themselves as well as their wider activities to broker knowledge across the stakeholders involved, which include meteorological and health experts but will also involve emergency planners and the wider resilience community.The results of this work will assist PHE in addressing stakeholder feedback from engagement through the Met Office Public Weather Service Customer User Group, the independent evaluation of the Heatwave and Cold Weather plans, annual seminars for the Heatwave and Cold Weather Plans, and an Alerts workshop, commissioned by Department of Health and Social Care in 2017 (involving PHE staff, Met Office, Devolved Administrations, NHS England and Local Authorities).The embedded researchers’ activities will support the development of the single Adverse Weather and Health Plan, a key PHE commitment under the National Adaptation Programme. Given the paucity of expertise across epidemiology, public health, climate resilience and meteorology, this opportunity will develop additional capacity through the development of the researchers themselves, the collaborations that they develop and the wider engagement they undertake through their cohort; this will benefit PHE, as the agency with the responsibility for ensuring that the public are protected from the health impacts of extreme weather and climate change.Translating the evidence into an operational system that will function effectively to deliver better health outcomes requires a high level of analytical skills, PHE will benefit from the additional academic expertise and rigour the researchers will bring to the work that they deliver.PHE will also benefit from the knowledge transfer across to EEHP team members, including core academic skills such as research methods and critical thinking.The embedded researchers will broker knowledge exchange across multidisciplinary networks, these activities will help to expand the professional network for EEHP staff and to extend their scope of influence across these networks, increasing their capacity and impact.While this work is a priority for EEHP and PHE, existing capacity and expertise in the team is limited due to the competing demands across our policy and response functions. The embedded researchers will be able to focus on this specific programme of work and ensure that the momentum continues, conferring a very significant benefit to the existing team. |

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| **Expected benefits for successful applicant**  |
| * Development of expertise across epidemiology and meteorology, as well as an understanding of the health and social care system in England. These are highly valued skills within the climate change and health community.
* Opportunity to conduct action-orientated policy-relevant research, which will directly support the development of a cross government plan (i.e. the adverse weather and health plan).
* Co-produce outputs of national and international interest, to academic audiences in the form of peer-review publications as well as policy makers in other countries with an interest in developing and/or reviewing their own systems. The Heatwave Plan for England has been used as a template for plans worldwide.
* Increased understanding of policy formulation and decision-making processes, improving the quality of their future research practice and increasing the impact of their future outputs.
* There will be a focus on implementation and evaluation, which are key skills for developing action-oriented research.
* Gain unique experience across operational risk management, long term climate adaptation, risk communication and climate vulnerability within the health sector.
* Understanding of national and local activities undertaken in response to extreme weather events, including cross governmental roles and responsibilities with regards to resilience.
* The researchers will be supported to develop a wide professional network, across meteorological and health partners, providing a foundation for future working relationships and collaboration.
* As an embedded member of staff, the researchers will have access to a wide range of PHE and Civil Service learning and development opportunities, both online courses and formal training.
* The researchers will be supported by senior members of the team, with extensive experience in developing and supporting junior staff and visiting workers, including Speciality Registrars in Public Health.
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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| Public Health England (PHE) exists to protect the nation’s health and wellbeing. We do this through world-leading science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide the public, national government, local government, the NHS, Parliament and industry with evidence-based professional, scientific and delivery expertise and support.The Extreme Events and Health Protection Team is the national focal point for expert support to build resilience and promote climate change adaptation to protect public health from high impact weather. The team coordinates the Heatwave and Cold weather plans for England on behalf of the Department for Health and Social Care, the Local Government Association and NHS England, and lead on the public health aspects of flooding. The team is also a focal point within PHE for the National Adaptation Programme and Climate Change Risk Assessment.PHE is a Category 1 responder under the Civil Contingencies Act (CCA 2004). It therefore has a statutory duty to make the public aware of the risks of emergencies and to warn and inform them in the event of an emergency. In the context of hot and cold weather, this encompasses both increasing awareness of the health risks of temperature extremes year-round and alerting the public to an expected or actual hot or cold weather event. The adverse impact of cold and heat on health are well established, and many of the impacts can be mitigated through actions of individuals, communities and organisations. Alerting the public and professionals to temperatures that may harm health allows preparation and planning of potentially life-saving actions.At present, hot weather and cold weather alerting systems are in place in England that aim to notify health professionals of temperature extremes, based on the probability of reaching threshold temperature levels. Additional evidence and experience has evolved since these alerting systems were first developed, in terms of understanding of the health impacts and relevant meteorological metrics, as well as population vulnerabilities and behavioural insights.EEHP activities are currently focused on developing a single adverse weather and health plan, which will bring together and improve existing guidance with an aim to mainstream action within the health system and local communities, reduce health risks associated with adverse weather and address the health risks identified in the second Climate Change Risk Assessment (CCRA2).This new plan will develop capabilities to address the health impacts of adverse weather events now, whilst preparing us for the increasing challenge that climate change will bring as adverse weather events become more severe and frequent. A significant element of this programme of work is a review of the current alerting systems, including an assessment of the underpinning evidence on epidemiological thresholds as well as the core functions of the plans themselves, the operational goals, the alerting systems and population vulnerability, now and in a future climate.  |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Dr Emer OConnell / Dr Owen Landeg | Consultant in Public Health and Head of Extreme Events and Health Protection | Extreme Events and Health Protection, PHE | extremeevents@phe.gov.uk inbox, flagged For Attention Of: Emer OConnell / Owen Landeg |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | **3rd August 2020** |
| **Duration of placement (months)** [no more than 12 months] | **12 months** |
| **Anticipated working schedule** [to be negotiated between host and researcher] | **Up to full time** |

# **Satellite Applications Catapult**: “Strengthening UK’s geospatial monitoring and satellite-enabled climate services to address extreme conditions of water and land resources”

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| **Project title**  | Strengthening UK’s geospatial monitoring and satellite-enabled climate services to address extreme conditions of water and land resources. |

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| **Organisation name**  |
| **Satellite Applications Catapult** Electron Building, Fermi Avenue, Harwell Oxford, Didcot, Oxfordshire, OX11 0QR, UK |

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| **Project and activities to be undertaken by successful applicant**  |
| The aim of this project will be to strengthen the UK’s geospatial monitoring capabilities through the co-creation of satellite-enabled climate services to provide actionable insights to UK government and local communities to increase climate resilience and respond to extreme water and land-related challenges (i.e. floods, drought, biodiversity loss, land degradation). The project will start with a discovery phase to explore these challenge areas facing the UK: 1) flood prediction and adaptation 2) coastal erosion, and 3) land use and land health (i.e. subsidence earth movement, soil moisture, degradation) particularly in areas of urban/rural interface.  These challenge areas will be examined within the context of strengthening one of the regions and related economies most affected by these climate risks.  Then scaling this out both across the UK and then to the other focus areas.  Through the discovery phase the researcher would narrow the project down to a specific challenge and regional focus to start with. During the following phase, the researcher would create a stakeholder map for the selected challenge, providing a full picture of the current landscape and then identifying any gaps. This would include stakeholder mapping of all end users to include communities and industry affected by these risks, academics in related fields, government agencies, and climate service providers already addressing these challenges.  The output of the discovery phase would be to 1) Engage with stakeholders; including current climate service providers and  start to build a strong network across these stakeholders 2) Educate stakeholders on how they can harness geospatial intelligence to improve the services they provide and help them form new partnerships to do this 3) Identify gaps in the climate services market and 4) Identify a case study for the project. The researcher would have the opportunity to write a white paper and case study on the findings of the discovery phase. Next, the researcher would work with the network established to co-produce an ecosystem of satellite-enabled solutions to bring the existing landscape together and to bridge any gaps in the market leading to an enhanced market of satellite-enabled climate services to address the challenge identified.  The researcher would work with industry and government to create a small consortium that could develop a prototype solution together, tests its feasibility and turn it into a demonstration.  The group would also co-create a proposal to fund this idea and secure funding to continue the project by the end of the year. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Satellite Applications Catapult has run a successful Researcher in Residence (RiR) Programme funded by EPSRC. We have developed the Embedded Researcher Programme building on the lessons learnt and good practice from RiR. **Management:** The Embedded Researcher (ER) will be integrated within the Sustainable Development programme and will also have the opportunity to collaborate with other value streams across the Catapult in relation to UK climate resilience. The ER will be assigned a Catapult line manager from within the Sustainable Development team, with general support/guidance from the Head of KE. Each of our Value Streams and Programmes are at different stages of maturity, so the embedded researcher will spend up to two weeks in a specially crafted induction programme, undertaking a design sprint with the Catapult design team, to baseline the team’s and researcher’s complementary knowledge and refine a programme of work for the embedded researcher from the outputs. The researcher will share their knowledge on the topic area, through *ad hoc* meetings and through a facilitated slot within our lunchtime seminar programme. **Governance and Evaluation:** In addition to day-to-day management, a Steering Board comprised of high-level stakeholders including our CTO, Technical leads, and CEO Office will review the progress of the ER (milestones and metrics) and add value by complementing and connecting their respective networks of collaborators, activities and expertise and thus ensuring adherence to programme requirements. The programme of work will ensure that a clear pathway to impact is defined for the residency term. Table 1 shows our proposed logic model for this programme, which will be used to develop the programme of work and performance metrics for the ER.

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| **Activity** | **Outputs** | **Outcomes** | **Impacts** |
| Embedded Researcher working on a set of projects linked to sustainable development goals | -Opportunities for growth identified through the projects-Academic/Business community building-Dissemination workshops for each ER with academia and business-Thought leadership through journal articles, publications and conference attendance  | -Companies benefiting from the KE and increasing their adoption of Satellite technologies and improving their business and technical skills -More rapid development of satellite related technologies through incorporating University innovation--Universities benefit from greater awareness of business challenges -Increased linkage between University and businesses  | - Social and Environmental benefits (improved living standards, climate action plans, sustainable land use) -Business Creation and co-production (start-ups and spin outs)- Business Growth (turnover, headcount, exports)- Public Service Improvement (reduced costs, productivity)-IP generated -Improved progression of technology through TRL levels as a result of improved business-academia connectivity. |

**Table 2: Satellite Application Catapult Logic Model for Embedded Researcher Programme****ER Personal Development and Sustainability**During their residency, in addition to contributing towards our Thread and Programme development, we will support the ER to develop their own skills: business development, working alongside our business analysts and exposure to our business and space networks; technical skills through working alongside satellite technology and data experts; providing opportunities to influence strategy and policy, through our Government Services team; and thought leadership, through writing policy documents and white papers, articles and blogs.The ER will become a fully integrated member of the Catapult’s KE network. The ER will join a monthly KE networking call, our KE web-forum, twice-yearly networking events (hosted by our Centres in turn) and our monthly business-academic networking events. Therefore, as with our Centres of Excellence and KE Fellows they will have a dedicated webpage on the Catapults Website. We will encourage them to contribute to the KE programme through writing articles for the newsletters and blogs. We would anticipate that the ER would participate in events and workshops, and we will invite them to present at a lunch time seminar to all Catapult staff to ensure strong linkages across our organisation. The residency will culminate in a dissemination workshop for both businesses and academia to benefit from the exciting outcomes from the ER, in alignment with pathways to impact model. The ER will be invited to remain part of the Catapult’s network and will continue to receive updates on our activities and be invited to relevant events. We expect that their residency with us helping to shape the future projects, which may be in collaboration with the ER, will continue to add value and demonstrate impact post residency, including outcomes outlined in the project summary. |

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| **Expected outputs & benefits for host organisation**  |
| * Establish a community of interest across UK stakeholders around climate resilience focus areas, including academia, government and industry. Leading to a stronger network and new partnerships within this sector.
* Identify UK challenge area and region of focus with related landscape map and user requirements.
* New technical capabilities for geospatial monitoring of water and land resources.
* New business models to support the co-production of satellite-enabled climate services.
* Bringing new companies into the space sector by providing access to geospatial intelligence.
* Supporting UK space sector companies to grow and scale climate services across the UK.
* Work with a climate expert who can offer advice on sustainable development programme.
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| **Expected benefits for successful applicant**  |
| * Increased knowledge of and access to geospatial intelligence and other satellite-related technology.
* Experience developing and delivering a user centred design process for discover to focus area and location for this project, which could be applied to future research.
* In-depth knowledge gained through qualitative and quantitative research of the selected focus areas and challenges faced by stakeholders.
* Access to Sat Apps regional networks across academia, government and industry.
* Thought leadership in focus area backed up by a community of interest around climate-resilience.
* Opportunity to co-produce satellite-enabled climate services and commercial outcomes.
* Publish white paper, case studies, blogs on discovery phase, selected focus area and landscape map outcomes.
* Experience in commercial world and in the field working with climate service providers to strengthen communities and economies.
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| **Host organisation summary** (including relevance to UK Climate Resilience programme)  |
| The Satellite Applications Catapult (Sat Apps) is a not-for-profit technology, innovation and research organisation and one of a network of Catapult centres established by Innovate UK to accelerate the take up of emerging technologies. Sat Apps acts as a neutral trusted entry point to an entire network of UK expertise in applications development across government, academia and industry. The company's primary purpose is to promote, develop and facilitate the commercialisation and advancement of the satellite applications industry. The Catapult brings together multi-disciplinary and skilled teams to generate ideas and solutions in an open innovative and collaborative environment. We also have a wide range of facilities, platforms and laboratories to enable the best businesses, researchers and end-users to work together to develop new satellite-based products, services and application, translating ideas from concept to market. At Sat Apps we focus on several market areas, including Sustainable Development & Finance and Agriculture in addition to our technology focus on geospatial intelligence and ubiquitous connectivity, all of which would provide a wealth of resources to this project. Our Sustainable Development programme focuses on climate and sustainable economies both here in the UK and internationally as well as technology for conservation, land use and natural capital, which would directly link with this project. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Heather Garrick | Head of Sustainable Development & Business Engagement Manager | Sustainable Development Programme and Partnerships and Engagement Team | Heather.garrick@sa.catapult.org.uk |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | September 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Flexible (based on location and preference of researcher) with regular visits to the Catapult.  |

# **Space4Climate**: “Exploiting climate satellite data to support UK based organisations in climate risk disclosure and climate management of business operations”

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| **Project title**  | Exploiting climate satellite data to support UK based organisations in climate risk disclosure and climate management of business operations. |

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| **Organisation name**  |
| Space4Climate group, NCEO University of Reading Space4Climate has three project areas available for the embedded researcher programme:1. CLIMATE RISK DISCLOSURE - Development of a stress test facility for UK organisations, with global reach - enabling them to stress test their capital investments against environmental change.
2. CLIMATE MANAGEMENT ‘Vegetation health index in a changing climate’, pilot in London
3. CLIMATE RISK DISCLSOURE AND CLIMATE MANAGEMENT Business resilience health check tool, to help SMEs and freelancers understand and manage the risks presented to their business, staff and operations by climate change.
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| **Project and activities to be undertaken by successful applicant**  |
| 1. Compiling a global objective index drawing on climate EO satellite data and other robust datasets to provide a stress test facility for UK organisations, with global reach, enabling them to stress test their capital investments against environmental change. This will build on user technical scoping underway with the Space4Climate Climate Risk Disclosure Task group and the UK, European and N. American actuarial community.
2. Developing a ‘Vegetation health index in a changing climate’, pilot in London –a robust, researched facility to alert GI managers in London when vegetation is suffering stress so that they can catch it early which might in the longer term save on energy and water. This will involve working closely with identified land managers across London who do monitor vegetation health closely and have long records e.g. Wimbledon tennis, Lords, Crown Estates and other members of the Fit for the Future network. It will also involve creating a baseline for an emerging development with a strong green infrastructure vision e.g. Thamesmead. In addition to the pilot, we’d like the researchers to use access to the Space4Climate community, Natural England and LCCP members to scope requirements to for a UK wide system to monitor benefits and any other impacts of Green Infrastructure ecosystem services in a changing climate
3. Working to bring climate data - integrate historical climate datasets and UKCP18 datasets/information derived from, into an existing Business resilience health check tool, to help SMEs understand and manage the risks presented to their business, staff and operations by climate change. We would like to explore developing a pilot for London and perhaps another city to prove concept. Institute of Chartered Accountants in England and Wales members often act in a business advisory capacity and would benefit from such a tool UK wide. Needs for this supporting information have already been flagged by their members.

We are also scoping use of climate satellite data for borough level public health planning and with CIRIA in relation to risks posed by contaminated land and remediation measures not designed with climate change in mind. However our scoping meeting with CIRIA is later this month so we do not yet have a worked up idea to propose. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The placement would be managed with weekly catchups with the Space4Climate climate services development manager. The researcher will be expected to attend relevant networking events with the Space4Climate manager, possibly trade shows is relevant to the placement during the timeframe and be coached to learn how to, and supported with running, successful multi-stakeholder coproduction workshops, to identify and understand the relevant decision-making contexts as well as current challenges to the uptake of climate information. This information will then be used to define technical scope of work, format and location of outputs and KE activities required throughout to ensure uptake and success of outcomes.We suspect part of the barrier to uptake to climate EO data is Desk space in the Space4Climate office, current at the Meteorology Department of the University of Reading, but, depending on the topic area agreed with the researcher, we would seek to provide one month placements with up to three of our members for exposure to public, private and non-governmental organisations operation in the climate space community.The Satellite Application Catapult is a member of the Space4Climate group and will support the climate services development manager with the learning and experience from its successful Researcher in Residence (RiR) Programme funded by EPSRC. This is includes a clear plan for management of ER, Governance and Evaluation, Pathway to Impact, ER Personal Development and building networks in the chosen focused market area. |

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| **Expected outputs & benefits for host organisation**  |
| Climate services prototypes based on robust data, data architecture (drawing in, where appropriate, built environment, business and socio-economic datasets) and climate analytics, developed, ready for scaling, proving exploitation potential of climate EO data.Space4Climate is aware a new type of hybrid academic professional is required and believes this embedded research programme will help scope out what that should entail and how it should function -academics who for a proportion of their time form a nationwide support service to bridge between the UK’s world leading climate EO expertise and those in the public sector/other scientific disciplines seeking to exploit the datasets for social and economic benefit. Enhance connections into the research community and new ideas and research coming through from doctoral researchersInsights into how the satellite data can be further exploited for UK science advancement.Possibly barriers identified in the climate EO data seamless supply chain that we can then work to address. |
| **Expected benefits for successful applicant**  |
| * Work on a project that will enable research to be used outside of academia, applied in daily life
* Build up UK academic and non-academic network
* Be embedded in the heart of one of the few climate focussed boundary spanning organisations with a track record, still running
* Mentoring plan developed to fit where the researcher feels they’d like to develop confidence and capability and mentor(s) drawn in from the Space4Cliamte group membership
* Potential active role in Space4Climate member activities around COP, contributing to projects that will help enable the ambitions to become a legacy
* Learn how impact can be generated, on a very low budget and set of resources, through partnership working
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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| Space4Climate is a group whose members span government, industry and academia, working in partnership to raise the profile of, and support, the UK’s world-leading climate community in delivering, sustaining and making use of trusted climate information from space. Space4Climate builds on the UK’s trusted expertise in climate data. We do this by coordinating activities, expertise and resources across our partners to:* Expand market uptake domestically and internationally, raising the profile of UK expertise, products and services, identifying climate services user requirements and facilitating and brokering new market growth opportunities.
* Sustain and grow the competent network, expanding our community by developing and maintaining lists of UK providers, and building community capacity by providing training and alerts to funding sources.
* Support delivery of a seamless supply chain, by identifying new requirements and barriers to provision and sustainability, and working together to address these.

The group’s activities enable a seamless supply chain of climate data from space assets, help identify climate services user requirements and facilitate climate services development for global economic and societal benefit.The group has been working with green finance, cities, environmental consultancies and the built environment sectors based in the UK to explore how ESA and climate datasets on CEDA can be exploited for social and economic benefit both domestically and abroad. Much of the group’s activities over the past three years has been focused on building connections between UK EO experts, the people (and organisations) who are interested in and can make use of this knowledge, and developing an understanding of their decision-making processes. As a result, we’ve identified a number of areas where boundary work is needed to bring together the datasets and develop an analytical architecture and output format that meets the user requirements of often neglected, or poorly geospatially equipped/literate, areas of local government, SMEs and land managers.The group has cofounded MESH, a networking platform for the UK climate services community with 140 members and growing, from researchers and civil services to private sector, professional bodies and third sector organisations. It provides a platform for members to share achievements and learning, and to find other UK-based organisations to work with to produce climate services for economic and societal benefit within the UK and globally.The Space4Cliamte group draws together fragmented climate research and expertise from the space sector and from others including the built environment, green finance and air quality communities, to deliver robust, multi- and inter-disciplinary climate risk and adaptation climate services. Its work in the UK seeks, inline with and supportive of UKRI’s UK Climate Resilience programme, to ensure the UK benefits from exploitation of climate satellite data to support resilience to climate variability and change, and be positioned to exploit the opportunities of adaptation and green growth. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Briony Turner | Climate Services Development Manager | Space4Climate, NCEO hosted at the Meteorology Department, University of Reading |  **T:** +44 07785 358 776   **E:** b.d.turner@reading.ac.uk     |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 9 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Anticipated approx. 60% |

# **The Schumacher Institute**: “Stress testing the visions, plans and processes of a city region in the light of climate change and its drivers – are plans and resilience compatible?”

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| **Project title**  | Stress testing the visions, plans and processes of a city region in the light of climate change and its drivers – are plans and resilience compatible? |

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| **Organisation name**  |
| The Schumacher Institute, Bristol |

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| **Project and activities to be undertaken by successful applicant**  |
| The *One City Approach* in the city of Bristol brings together a wide range of public, private, and third sector partners. They aim to make Bristol a fair, healthy and sustainable city. Bristol states that it will be a carbon-neutral city by 2030 (<https://www.bristolonecity.com/>). The One City Plan (OCP) describes where we want to be by 2050. It has detailed targets by decade across six themes: Connectivity, Economy, Environment, Health and Well-being, Homes and Community, and Learning And Skills. It aligns with the Sustainable Development Goals. The One City Plan currently has 546 initiatives (Jan 2020) and an online dashboard to present progress.Within the context of multiple, global megatrends, this project will consider climate change effects and resilience efforts on the city of Bristol and the surrounding eco-social region. We will work with a set of scenarios that covers the range of climate change stress from mild effects through to near term societal collapse.The objective is to stress test the OCP against these climate change scenarios (and the drivers of global warming).* to determine what are the underlying assumptions in the detail of the OCP and are they robust against global megatrends (sensitivity analysis)
* to determine modes of failure - how might the city systems fail (reverse stress tests)
* how do the combination and interaction of megatrends produce scenarios in which we can evaluate the fragility of the OCP (multi-factor, scenario analysis)

This project will look at the climate resilience of the city of Bristol in the light of these and other targets and the planned actions to reduce emissions and to build a sustainable living future. The research will investigate the inter-relationship of resilience capacity building and the pursuit of a multitude of other goals covered in the planning process.The project will use a massive response framework to stress test the One City Plan placing the actions and changes required in the initiatives against their impact on climate change. And conversely to assess the systemic impact on achieving the targets given the actions needed to obtain carbon neutrality and become climate resilient. A massive response framework considers the scale of change against a scale of participation – is it one big action by one player or many **small** actions by the whole population? How do climate resilience concepts reconcile across scales from national through to community.The project will answer these questions:1. Will the initiatives in the OCP improve or detract from the climate resilience of the city?
2. How will climate change affect the initiatives – are they sufficiently climate resilient in their formulation?
3. How do we create a continuous process of systems thinking for embedding resilience in the One City Plan as it unfolds?

The methodology is systems thinking and it would be participatory, with involvement in the ongoing One City Approach to inform and to shape city policies and plans.The activities of the successful applicant will include:* Getting familiar with the main players in the city and surrounding region.
* Defining a methodology to review initiatives and the factors involved – a systems mapping process and massive response framework.
* Systematically categorising the elements of the One City Plan on a climate vulnerability scale.
* Conducting interviews and running workshops with key players, such as BGCP, to explore what climate resilience means for specific planned activities.
* Taking part in the One City Plan development by attending the regular meetings.
* Producing briefing papers to use with key players to strengthen the initiatives with respect to climate change.
* Running workshops to engage people in understanding the issues.
* Producing a full report that reviews the whole OCP and process in the light of climate resilience.
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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The Schumacher Institute has offices in Bristol and space to accommodate a researcher. We operate as a charitable fellowship (160+ around the world) of scholars, consultants and educators all applying system sciences to issues of sustainability and social justice. We run regular conferences, seminars and workshops and take part in practical efforts to build resilience. The researcher would be part of a vibrant community and would be offered a fellowship of the institute. They would be under the direct management of the director but working with other members of the management team. |

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| **Expected outputs & benefits for host organisation**  |
| We wish to increase our involvement in the work of the One City Plan (OCP - see below) in Bristol, bringing in a climate resilience critique to the process. The intention is to influence leaders in the city across all sectors to build climate resilience thinking into their plans and activities, to prepare them for changes to their assumptions - to question how much they are in a ‘business as usual’ mindset.We will run workshops in the region to work with leaders, concerned people, and the academic communities (University of Bristol - Cabot Institute, UWE and Bath University). We will produce a report called ‘Stress testing the One City Plan for climate resilience’ and present this through seminars or conference. The objective is to strengthen the OCP through critical review.The benefit to the institute is to build our capacity to conduct system thinking projects and to enhance our profile for resilience and climate change work. |

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| **Expected benefits for successful applicant**  |
| We expect the successful applicant would learn about the complexity of society and the difficulty of orchestrating change to meet the challenge of climate resilience. This would arise from working with an existing, and award-winning, approach to planning a city and its region. The specific benefits, in no particular order, would include:* Exposure to senior people in all sectors.
* A deep understanding of how a city region works and the chaotic process of policymaking.
* Development of systems thinking skills.
* Involvement in shaping initiatives – working diplomatically (as a futurist this is essential).
* An awareness of the interconnection of global megatrends and the symptoms of climate change.
* A completed report and the opportunity to present findings.
* Direct mentoring from people in the institute.
* Joining a long term community – people can never leave us.
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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| The Schumacher Institute for Sustainable Systems was formed in 2008 as an independent fellowship organisation, it is a charity. It is named in honour of E. F. Schumacher, author of *Small Is Beautiful*, whose work continues to have a major influence in the environmental, economic and social justice fields. We provide public education, training, consultancy, research, and support to young people in these fields - particularly applying system sciences in our projects. Over the years we have been on the boards of Low Carbon South West and the Bristol Green Capital Partnership (BGCP) getting closely involved with the city of Bristol and its region. We were instrumental in the city obtaining the Rockefeller 100 Resilient City Network status and worked closely with the Strategic Resilience Officer in building resilience plans (she is a fellow of the institute). We are active in the development of the One City Plan and we are part of the city’s SDG Alliance group.One of our main projects is *Prepare for Change* - this provides a monitoring and systems modelling service so that we can prepare for an increasingly volatile and uncertain world. This horizon scanning process covers the threats of climate change, energy constraints, food insecurity, resource scarcity, and many other potential crises. However, it also identifies opportunities emerging from new technologies, social trends and government policies. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| **Ian Roderick** | **Director** |  | **ian@schumacherinstitute.org.uk** |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Flexible – full or part-time is possible |

# **Welsh Government**: “How resilient are buildings in the UK and Wales to the challenges associated with a changing climate: practical recommendations for risk based adaptation”

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| **Project title**  | How resilient are buildings in the UK and Wales to the challenges associated with a changing climate: practical recommendations for risk based adaptation |

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| **Organisation name**  |
| Welsh Government |

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| **Project and activities to be undertaken by successful applicant**  |
| This project will look at the resilience and vulnerabilities of the building stock in the UK, and Wales specifically, to the risks associated with climate change. The project will identify a range of potential impacts on the structure and fabric of buildings and the health of occupants, identifying practical interventions for adaptation. The successful applicant will be required to do the following:* Examine current mandatory and voluntary building regulations and standards applicable to Wales (because of the devolved competency of building regulation control) and the wider UK context, and determine:
* whether they effectively mandate climate change risk management activities relating to existing and new building stock
* their capability for future-focus and timely integration of climate resilient best practices into legislation
* Establish what research and evidence is available that:
* assesses the risks to buildings (current and future) from the effects of climate change and defines the appropriate climate resilient measures to apply to a building’s design and structure
* identifies the range, scale and effectiveness of adaptation practices currently being applied at national level
* demonstrates the degree of resilience that exists within the current building stock in Wales
* Establish the range of climate and non-climate related data sources currently available across the UK and determine how they can be brought together to assist with the mapping of risks/interactions/vulnerabilities in order to advance decision-making capability relating to building practices and adaptation plans

The project will be largely desk based, drawing on and reviewing the current literature and expert opinion on housing conditions, building regulations and how climate variabilities are likely to impact building integrity, usage and health of occupants.  |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| The location of the work base is dependent upon the proximity of the applicant’s home location to Welsh Government offices. Periodic attendance at meetings in the main office in Cathays Park, Cardiff will be a requirement, as well as regional office locations across Wales. IT equipment will be provided. |

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| **Expected outputs & benefits for host organisation**  |
| Embedded research within Welsh Government will address the identified knowledge gaps through the production of the following outputs: * Synthesis of existing science and research, which takes into account local and regional variations
* Identification of research at UK level that explores the risks (current and future) from rain, mould and damp to buildings of differing types and in differing geographical areas
* Assessment of whether housing interventions which aim to reduce energy use and increase warmth in winter can change indoor air quality in buildings (e.g. will changing ventilation rates and the permeability of the building envelope exacerbate indoor air pollution and heat-related health issues during warmer weather conditions?)
* Baseline understanding of how existing mandatory and voluntary building industry standards address climate change risk
* Understanding of climate change adaptations currently being employed across the UK, how widespread they are and how effective they are
* Evaluation of how climate and non-climate related data sets can be brought together to assist with mapping of risks and interactions
* Creation of an evidence base of occupational standards relating to the building industry
* Identification of evidence gaps and recommendations for further research

The benefits of these outputs will be realised in the following ways:* Provision of a sound evidence base to support the development of Welsh Government policy which will address how future-focussed climate resilience and adaptation approaches to property standards are adopted
* An understanding of Wales-specific climate change risks and projected impacts
* Recommendations that will inform the development of climate change predictive tools to inform decision-making associated with, for example, planning applications, building specification design and building location
* Identification of vulnerabilities to inform decision-making around adaptation plans
* Creation of new industry occupational training standards for adoption by, for example, the Construction Industry Training Board
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| **Expected benefits for successful applicant**  |
| The successful applicant will be supported throughout the research programme by regular engagement with a steering group comprised of officials and experts from across Welsh Government and relevant partner organisations, with the aim of reviewing progress to an agreed work plan, determining revisions to it as and when identified by the outcomes of the research and generally guiding the individual to achieve a successful outcome and rewarding experience. The scope of work will lead to:* an understanding of current and future building stock across Wales and the UK, their potential vulnerabilities to climate change, and how these impacts can affect the health of the occupants
* Develop expertise in building voluntary and mandatory building standards and code and their adequacy in relation to climate risks and resilience
* an understanding of the policy making process and the role of evidence within it
* expertise on generating and translating science for policy makers
* direct influence on the generation of new policies, standards and regulations in Wales
* experience of working with policy decision makers and Ministers
* opportunities for in-house training and development
* working with a diverse group of stakeholders from government, regulators, industry and the third sector
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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| Under the Climate Change Act 2008, Welsh Government is required to address the challenges of climate change including threats to our health, economy, infrastructure and natural environment. In May 2019, Wales made history by becoming the first national Parliament to pass a motion declaring a climate emergency. As a government with devolved powers, we have a responsibility to ensure policy is resilient to future change. This requirement is set out in our wellbeing goal of “A Resilient Wales” within the [Wellbeing of Future Generations (Wales) Act 2015](https://futuregenerations.wales/about-us/future-generations-act/).In November 2019 Welsh Government published a 5-year climate change adaptation plan [Prosperity for All: A Climate Conscious Wales (2020 - 2025)](https://gov.wales/prosperity-all-climate-conscious-wales) which sets out commitments to respond to current and future impacts of climate change. The plan aims to address the areas of greatest risk to Wales and complements the steps being taken to decarbonise the economy of Wales (as set out in [Prosperity for All: A Low Carbon Wales](https://gov.wales/prosperity-all-low-carbon-wales)). The plan also responds to the more urgent risks detailed in the [UK Climate Change Risk Assessment (CCRA2](https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/uk-climate-change-risk-assessment-2017/)), i.e. the existence of evidence gaps, the need to prioritise areas of research in order to fully understand the risks and develop policy to manage the impacts of those risks. Specific to this application, the CCRA2 identified two priority areas of research which fall into areas of devolved competence \* which overlap one another and are of particular interest to Welsh Government:1. CCRA2 Risk Ref. PB7 - Risks to building fabric from moisture, wind and driving rain under future climate driven changes in weather patterns.
2. CCRA2 Risk Ref. PB10 - Risks to health from changes in air quality, including indoor air quality.

The areas of research aim to determine the measures and applied practices required to ensure that the existing and future property stock in Wales is:* capable of being resilient to the pressures of climate change
* able to benefit the health and wellbeing of future generations, including whether climate change is likely to exacerbate heath impacts caused by increased temperature and/or indoor air pollution
* cost-effective to build and maintain

Researching these knowledge gaps, via an embedded researcher at Welsh Government, is highly relevant to the themes of the [UK Climate Resilience Programme](https://www.ukclimateresilience.org/). As a significant deliverer of adaptation policy in the UK, Welsh Government is well-placed to review laws and governance and implement change as a result of research recommendations identified. (\* Welsh Government has devolved competencies in policy areas relating to building standards and conditions, health and air pollution) |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| **Caryl Williams** | Head of Strategic Evidence and Geospatial | Economy, Skills and Natural Resources | **Caryl.Williams041@gov.wales**03000 254 971 |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | September 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full time |

# **Willis Towers Watson**: “Creating industry leading climate risk analytics through co-production of research projects and leveraging of existing data, methods and academic relationships”

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| **Project title**  | Creating industry leading climate risk analytics through co-production of research projects and leveraging of existing data, methods and academic relationships. |

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| **Organisation name**  |
| Willis Towers Watson, London, U.K. |

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| **Project and activities to be undertaken by successful applicant**  |
| In the last few years climate risk has risen on the agenda of corporate and insurance sector clients, and the WRN is key to bringing the latest academic insights to make our advice both credible and actionable. With a proliferation of consultancy companies providing a wide range of services, WTW needs to ensure that its suppliers are appropriately using the range to types of data that can represent our changing climate from historical observations to forward climate model projections, while filing in gaps in what is credibly available with our own models and methods. This requires two main activities:1. Exploring our internal requirements across the range of different teams at WTW, from Willis Re (Reinsurance) to Strategic Risk Consulting (climate risk advice for individual large complex clients in a variety of different industries). These requirements will represent the range of industries we work with.
2. Reviewing, critically appraising and making recommendations on appropriate use of the methodologies behind services we plan to procure, or already have procured, from external partners which are used to help us assess climate risk (catastrophe model vendors, climate risk consultancies, new academic data and services).
3. Assist in designing new climate risk tools and data to fit within WTW’s Climate QuantifiedTM suite of services. This will include including latest academic research and data from WRN partner and the wider climate science community.

These three main tasks will require the Researcher to provide both research insights and act as a knowledge broker for WTW and its clients. It will involve all the main desired activities outlined in the guidance document under section 3.3. * Co-exploring and signposting existing knowledge to support specific decision making contexts: Involvement on internal projects to assess specific risks or regions related to climate change will facilitate transfer of existing knowledge directly into client services, and help WTW be better able to win and retain clients. Achieved by producing thought leadership delivered via blogs, articles, internal briefings, newsletters.
* Co-producing new knowledge on processes of adaptation and building climate resilience: Leveraging WRN research projects and relationship to design internal models and/or data sets. Guiding internal teams on appropriate use of climate data and toolsfor specific practices. Designing new research projects to fill gaps in WTW capabilities and industry knowledge.
* Integrating relevant climate information into organisational decision making: Potential for involvement in WTW ESG reporting, including TCFD and financial sector regulatory responses. Being part of the wider WTW Climate Initiative to help change practices within the company and industry.
* Strengthening networks across the public, private and civil society sectors and building a culture of learning within these networks: Will bolster the WRN management team with a focus on climate risk and resilience, and allows greater interaction with academic partners, collaborators and support for international funding bids from organisations such as the UN, World Bank or local to the UK, NERC).
* Sharing lessons about the practice of adapting to a changing climate: Developing case studies of research application and assisting with bids for new consultancy projects requires testimonial and case studies. Proving the viability often via cost benefit analysis is required to make climate risk material to many clients. Alternative methods of risk transfer also require research support in the development of parametric solutions and are increasingly of interest in climate risk adaptation.

The broad nature of the risk management industry requires and inherently multi and inter-disciplinary approach, and climate change provides a clear example of the need to explore all spheres of interconnected risks when dealing with global industries and large complex clients. |

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| **Host organisation support** [location of placement, how hosting arrangements will be managed and support available to researcher] |
| Location will be primarily the WTW London Office, but there will be opportunity to visit current WRN research partners externally and attend industry events. Geoffrey Saville will manage and support the placement, and work in close collaboration to guide the activities related to the project. A desk and laptop will be made available, and the Researcher will be introduced to a wide range of industry experts who are interested in developing climate risk analytics. Travel and expenses will be covered for work related events.  |

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| **Expected outputs & benefits for host organisation**  |
| * Assistance in guiding and developing our Climate QuantifiedTM suite of climate risk analytical tools.
* New insights into appropriate use of climate model data.
* New relationships or collaborations developed through the pursuit of best in class climate risk tools and data.
* Added support for management of existing WRN research portfolio.
* Added support for writing proposals and carrying out consultancy projects related to climate risk.
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| **Expected benefits for successful applicant**  |
| The successful applicant will receive a broad understanding of how the risk industry operates. This role will provide opportunity to interact will all aspects of insurance/reinsurance processes, investments, people management and pensions, in a corporate environment full of experts in the physical and social sciences, economics and engineering. The WRN sits in a unique positioncentral to a wide variety of activities, able provides credibility and academic insights which can give our client propositions a true differentiator to the competition. Through working with our catastrophe modelling analysis and risk engineers, the successful applicant will learn about some of techniques used in risk assessment and management, and how analytical tools are translated into advice for our clients. There will also be the opportunity to drive changes in practice to allow new techniques to be applied to current industry practice, so that climate change related risks can be addressed.The WRN management team have years of experience on the interface between academic and industry, providing the researcher with an opportunity to understand various ways to balance commercial drivers with academic endeavour. Collaboration between public and private entities raise many challenges but also presents opportunities to develop tangible outputs that can be applied to real world challenges. The risk management tools used in industry can also be used in the public sector and through public private partnerships and knowledge exchange, this role can help provide a sense of purpose in supporting economic development and financial resilience in regions without insurance industries. The difference between total economic loss and the loss that is covered by the insurance industry is called the ‘Protection Gap’ and through new data and methods, developed in the public domain, the WRN can be part of closing that gap and alleviating the burden of disaster response and recover from governments and international aid. The successful applicant will also gain access to WTW internal training courses, industry events and academic conferences to aid their professional development and competencies for the placement. Mentoring opportunities are also available, not just from the WRN management team, but via a WTW wide mentoring programme. |

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| **Host organisation summary (including relevance to UK Climate Resilience programme)**  |
| Willis Towers Watson is a leading global advisory, broking and risk solutions company led in the UK from its London office. With roots dating to 1828, WTW has more than 41,000 employees serving clients in more than 140 countries. WTW works with major corporations, emerging growth companies, multilateral institutions, governmental agencies, and not-for-profit institutions in a wide variety of industries, with many of our client relationships spanning decades. WTW has significant experience in providing risk quantification, analytics and advisory services to a broad range of public and private sector entities managing catastrophe risk around the world. We bring the financial sector perspective to innovative developments in disaster risk management and finance, developing and designing tools and products with the ultimate utility to the end-user, as well as feasibility and acceptability to risk transfer markets, in mind. As one of the world’s biggest users of catastrophe risk models, WTW has significant resource in validating third-party catastrophe models and other insurance-related risk assessment (e.g. parametric products).As an intermediary (i.e. risk advisor and broker), WTW is ideally situated to innovate and develop tools, products, and services to better meet the needs of the end-users of insurance and wider disaster risk management, keeping in mind considerations regarding the requirements of risk transfer markets. We’re not an insurer or risk taker and can therefore give neutral advice without any suspicion of conflict of interest. We are neutral about the mechanism used to transfer risk, and therefore highly qualified to weigh the respective benefits of a variety of instruments (e.g. insurance, reinsurance, and / or capital market instruments), product design (e.g. parametric, indemnity, and / or hybrid) and structures (e.g. standalone procurement, joint procurement, and / or risk pools), not to mention technical innovations that improve the accuracy of parametric products or availability of effective risk transfer.WTW are strong supporters of the UK Climate Resilience Program. As well as membership on the Program Steering Committee, WTW have longstanding relationships with NERC and the UK Research institute that have driven real value across and helped bridge the gap between industry and academia.Furthermore, WTW engages with cutting edge science through the Willis Research Network (WRN), an award-winning collaboration between academia, finance and insurance industries. The WRN integrates public science with re/insurance capabilities to enhance the collective ability to understand, evaluate and manage extreme natural catastrophes and to provide credible scientific expertise to improve risk decision making across the industry. The WRN is currently working on programs and projects across more than fifty science institutions worldwide, working with our re/insurance clients and partners to confront the full spectrum of modelling challenges of this domain. The WRN continues to build on the strength of its partnerships, delivering and incorporating solutions into insurance sector models, methodologies and transactions to improve the market’s understanding, resilience, and coverage of risk. We remain committed to investing in environmental science in the UK and globally to help understand the challenges of climate resilience. |

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| **Lead organisation contact(s)**  |
| **Name** | **Role** | **Division/Department:** | **Contact details** |
| Geoffrey Saville (main contact) | Senior Research Manager | Willis Research Network | geoffrey.saville@willistowerswatson.com |
| Stuart Calam | Programme Manager  | Willis Research Network | stuart.calam@willistowerswatson.com |

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| **Duration & flexibility of placement** |
| **Proposed start date (from August 2020):** | August 2020 |
| **Duration of placement (months)** [no more than 12 months] | 12 months |
| **Anticipated working schedule** [to be negotiated between host and researcher] | Up to full time: flexible working is available. |