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Impact Assessment Frontiers Part 1: Environment, Technology and Place

Thought pieces from UK and International practice

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GUEST EDITORIAL

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Impact assessment is defined by the International Association for Impact Assessment as, 'a structured process for considering the implications, for people and their environment, of proposed actions while there is still an opportunity to modify (or even, if appropriate, abandon) the proposals. It is applied at all levels of decision-making, from policies to specific projects.'[1]

Impact assessments can be associated with specific environmental and social topics, certain places or regions, or specific activities. While there are certain types of Impact Assessment (IA) such as Environmental Impact Assessment (EIA) that are well known both within the environmental and sustainability profession, there are likely to be many types of IA that you are aware of but have not experienced, others which you may never have heard of, and yet others that are only just coming into existence. The impact assessment landscape is always shifting and the frontier of practice in this area is an exciting place to be.

This is the first volume of a two-part series on exploring the frontiers of IA. This Volume looks into environmental IA with a focus on technology and place; Part 2 (Volume 21) will consider the frontiers of health, wellbeing and social impact assessments.

Here, we aim to shine a spotlight on a range of emergent IA forms and methodologies and the sectors in which they are used. The articles here provide the opportunity to share experiences, look into the practices of related impact assessment fields, and peer into the corners of our own practice areas. Hopefully this volume provides some inspiration for your IA activities and to improve IA practice; opportunities to borrow complementary approaches, or spark ideas to collaboratively resolve IA conundrums.

The first three articles explore how digital opportunities relate to multiple IA fields. Ella Niehorster explores how the use of databases in IA can bring both challenges and benefits, and she encourages others to give it a try. The second article is provided by Paul Wyeth who shares his perspective on the potential role of artificial intelligence (AI) and technology in improving seascape assessments. The theme of AI, and its responsible adoption, is picked up and explored further by Dr Vincent Miller, along with a discussion around the need for the impact assessment of AI itself.

The second set of articles reflect the strong desire among practitioners to improve existing IA practice approaches; a desire that supports the development of new IA approaches. Robyn Burman's article sets out the challenges faced in assessing the environmental impacts of a relatively new UK sector for the licensing of spaceflight activities. Valentina Cavanna explores new requirements for supply chain IA, which is something that relates to many products and services with which we may interact indirectly in our lives on a daily basis, but which we rarely see. Dino Giordanelli has provided an enlightening thought piece on the future of contaminated land assessments within or without EIA. The search is on for the proportionate assessment of impacts to designated heritage assets in the article by Jenny Timothy. The development of guiding principles in Ed Walker's article help to navigate uncertainty and implement highly specialist IA for coastal projects. Finally, Dr Rufus A Howard outlines Bioregional Impact Assessment as an innovative approach to the evolution of traditional EIA.

1 www.iaia.org/wiki-details.php?ID=4.

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Impact Assessment Database: in practice

Introduction

We completed the environmental assessment for the Preliminary Environmental Information Report (PEIR) of the River Thames Scheme[2] (RTS) within a shared database environment. The PEIR provides the information reasonably required for consultees to understand the likely significant effects of the RTS on the environment at the statutory consultation stage for this infrastructure project of national significance. The RTS is jointly promoted by the Environment Agency and Surrey County Council. The use of the shared database environment represented a step change in process for many of the people involved in the PEIR, since environmental assessment authors typically present their findings in a word-processed document. The new approach was adopted because it enables:

a) Robust coordination of the 13 separate topics

b) Useful functionality in the web-based version of the PEIR.

What does a shared database environment look like?

We used a Microsoft Excel spreadsheet saved on a SharePoint site for the shared database environment. Each topic 'owned' one tab within the spreadsheet, which was set up with a strictly controlled set of column headings (see Tables 1–3). The input options for each column were controlled to allow free text, a selection of predefined text (i.e., drop-downs) or calculations (e.g., for significant or not). The predefined text for the drop-downs was prepared and agreed in advance by the Environmental Impact Assessment (EIA) coordination team and included the significance of effect descriptions, project components and mitigation. The spreadsheet allowed spatial definition of each receptor (where applicable).

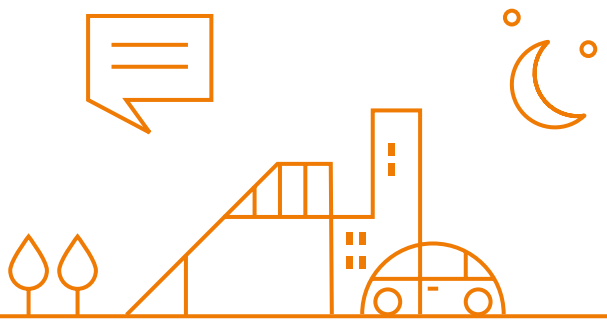


Table 1. Example of the headings included within the shared database environment spreadsheet. This is the first section about receptors.

1. Receptors				
General receptor data			**Receptor sensitivity**	
Receptor name	Feature ID	Receptor description	Sensitivity	Sensitivity commentary

Table 2. Example of the headings included within the shared database environment spreadsheet. This is the second section about construction effects (primary and tertiary mitigation and impact description).

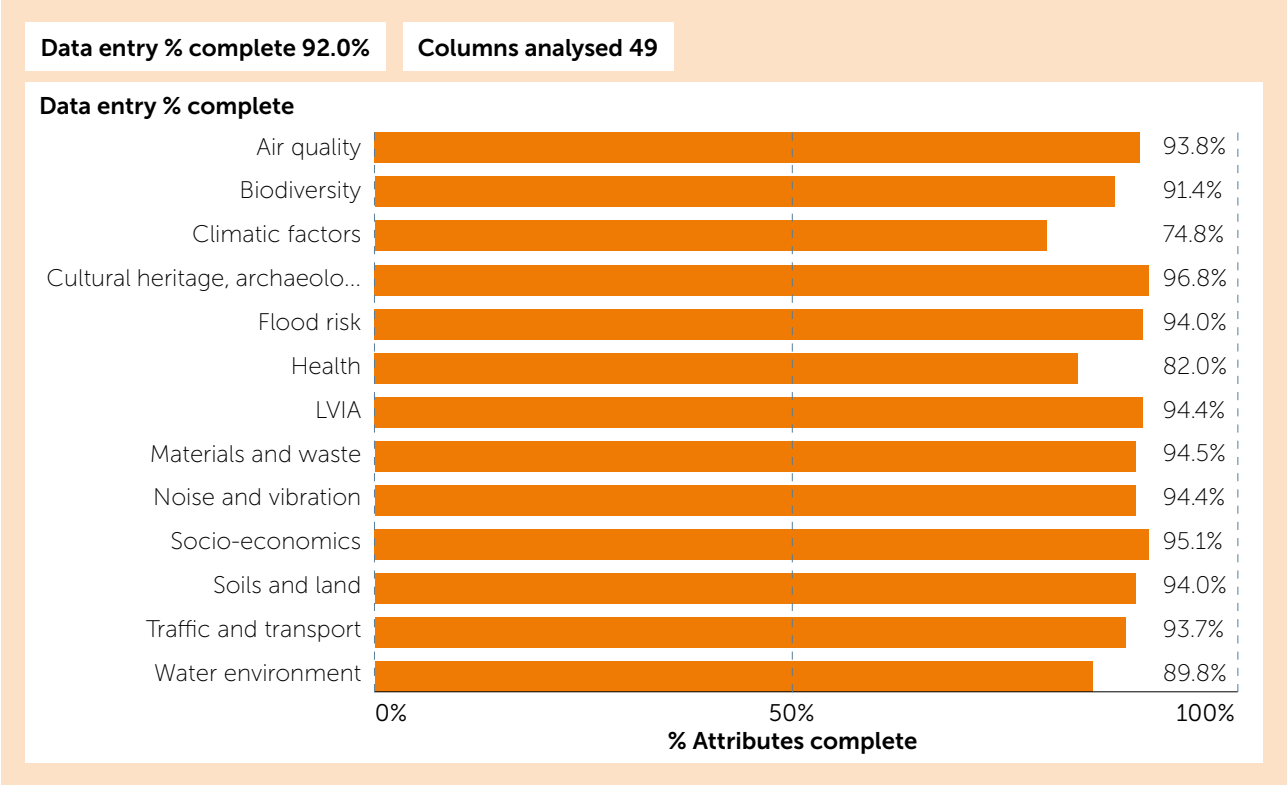
2. Construction effects (continued)					
	Embedded mitigation		**Impact assessment**		
Are there construction effects on this receptor?	Primary mitigation description	Tertiary mitigation description	Impact description	Project component(s) generating effects on receptor	Project activity(ies) generating effect upon receptor

Table 3. Example of the headings included within the shared database environment spreadsheet. This is the third section about construction effects (impact descriptors and secondary mitigation).

2. Construction effects (continued)						
Impact assessment (continued)						**Secondary mitigation**
Magnitude of impact	Significance of effect	Positive/ negative	Duration	Direct/ indirect/ secondary	Significant or not significant?	Mitigation description

The topic specialists completed their assessments within the spreadsheet. To assign spatial definitions to each receptor, they described each location and the Geographical Information System (GIS) team generated a feature ID to link the receptor with the spatial area. A 'Power BI' dashboard was provided, which automatically displayed information from the spreadsheet to give useful analytics, for example, the percentage complete of each tab of the spreadsheet (Figure 1). This was used to facilitate coordination.

Figure 1. Example of the progress monitoring element of the Power BI dashboard, which was automatically refreshed from the spreadsheet. The image was captured during the development of the PEIR.



The published outputs of the spreadsheet included:

- Impact assessment tables: an automatic export pulled text from selected columns of the spreadsheet into a word processing document (for example, see PEIR Appendix 6.3).[3] The information in these tables was summarised within the main chapters.
- Maps of significant effects: presented on each topic page of the PEIR summary website.[4] The data from the spreadsheet automatically flowed into a GIS database which, along with the assigned spatial information, allowed display and searching of effects on interactive web-based maps.

3 www.riverthamesscheme.org.uk/__data/assets/pdf_file/0009/362277/Appendix-6.3-Air-Quality-Significant-and-Non-Significant-Effects-Summary.pdf
4 experience.arcgis.com/experience/ff45d742f96e40b28938e72037401646

What were the challenges encountered?

Overall, the approach was successful and the PEIR was delivered using the shared database method with no major problems. However, there were teething problems with using this different type of approach. The key challenges included:

- Usability of the spreadsheet: The spreadsheet was large, with approximately 50 columns and as many rows as the topics defined. Navigating the large spreadsheet could be complicated, particularly as certain functionality had been locked down to avoid risks associated with loss of data (e.g., no ability to filter).

- Quality assurance: A little duplication was required as external reviews of the assessment were completed in the word processing document output from the spreadsheet (rather than the SharePoint site version of the spreadsheet) and there was an expectation that the external reviewer would be able to see the changes made in the output tables. Therefore, the tables could not be re-exported from the spreadsheet following updates, and instead, some updates had to be made in both the spreadsheet and output tables.

- Proportionate: Each row in the spreadsheet needed to be unique, i.e., the receptor identified in each row needed to have a single sensitivity value and experience a single impact. For example, several waterbodies could only be grouped together if they had the same sensitivity and impact as each other. This resulted in certain topics requiring several rows to define their receptors. However, this is a large project, so there is no guarantee that this would not have been the case if the assessment had been completed in a more traditional way.

What benefits were realised?

A number of benefits were realised through using this approach, including:

- Ensuring a consistent and thorough approach to the impact assessment across all topics, e.g., there was no ambiguity about which receptor would experience a certain impact.

- Mandated consistency by using dropdowns and auto-calculations. These measures reduced the burden of coordination.

- Enabling the presentation of the effects in multiple ways with limited duplication. A standard Environmental Statement approach would not easily allow the display of effects on web-based mapping.

Was it worth it, and what next?

Overall, the EIA team found the shared database approach to the PEIR very helpful. The intention is to use the same approach at the Environmental Statement stage, albeit addressing the above-mentioned challenges wherever possible. It is possible to adopt this approach on other projects, both within Binnies and more widely. Future development could include the creation of a database with a bespoke user interface to streamline the input process; however, it would be key to maintain flexibility in the input fields to suit all different types of project.

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Seascape assessment in the UK: current limitations and the role of AI and technology

Seascape Character Assessment (SCA), Marine Character Areas and Coastal Character Assessment

SCA provides a valuable approach for evaluating, characterising, mapping, and describing the unique qualities of coastal and marine environments. The SCA process is relatively new, and this is reflected in the various different terms by which these assessments can be known. The SCA process draws from the well-established principles and stages outlined in Landscape Character Assessment guidance, with specific attention to factors relevant to assessing the dynamic nature of seascapes. Landscape and seascape character assessments follow the European Landscape Convention.[5] National bodies within the UK have independently published a mixture of guidance on the process and potential outputs of SCA, and assessments of certain coast character areas: Natural England,[6] Department of Agriculture, Environment and Rural Affairs Northern Ireland,[7] NatureScot[8] and National Resources Wales.[9] Seascape is defined by Natural England in its position statement on All Landscapes Matter (2010) as, '...an area of sea, coastline and land, as perceived by people, whose character results from the actions and interactions of land with sea, by natural and/or human factors,' and as such, SCA primarily focuses on evaluating the character of coastal and marine areas from beyond the low water mark.

It is important to note that while SCA informs decisions related to seascape quality or value, the actual evaluation and judgement of development appropriateness is separate to, but informed by, an SCA. Seascape Impact Assessment (SIA) in the UK is the process of ensuring that development is appropriate and sympathetic to our marine and coastal environments. The approach to SIA in the UK has been shaped by various policies and guidelines, aiming to assess and describe impacts on seascape character. The SIA process follows the method of Landscape and Visual Impact Assessment (LVIA) and is influenced by the Guidelines for LVIA (3rd Edition).[10]

Current limitations of seascape assessment in the UK

Despite the structured approach to SCA and SIA, there are several limitations that challenge its effectiveness. One of the primary limitations is the complex nature of SCA and SIA. The character of a seascape is influenced by both natural and cultural components, as well as how these are understood and experienced by people. This subjectivity can make it difficult to achieve a standardised impact assessment, potentially leading to disputes or disagreements over the impact of certain developments or activities on the seascape.

5 CETS 176 - Draft European Landscape Convention as amended by the 2016 Protocol. Available at: rm.coe.int/16807b6bc7.
6 Natural England (2012) *An Approach to Seascape Character Assessment*. Available at: assets.publishing.service.gov.uk/media/5a7e2cb1ed915d74e33f088b/seascape-character-assessment.pdf.
7 Northern Ireland Environment Agency (2014) *Northern Ireland Regional Seascape Character Assessment*. Available at: www.daera-ni.gov.uk/publications/northern-ireland-regional-seascape-character-assessment.
8 NatureScot (2018) *Coastal Character Assessment*. Available at: www.nature.scot/professional-advice/landscape/coastal-character-assessment.
9 naturalresources.wales/evidence-and-data/maps/marine-character-areas.
10 Landscape Institute and IEMA (2013) *Guidelines for Landscape and Visual Impact Assessment (GLVIA3)*. Routledge. Available at: www.landscapeinstitute.org/technical/glvia3-panel.

Subjectivity can make it difficult to achieve a standardised impact assessment, potentially leading to disputes or disagreements over the impact of certain developments or activities on the seascape.

Furthermore, and perhaps most importantly, the current methods of impact assessment are based on landscape assessment and may not adequately capture the dynamic nature of seascapes, which are constantly changing due to natural processes (such as weather conditions, tides, and visibility) and human interventions (such as increased leisure boat use and coastal tourism). Traditional SIA methods adapted from landscape methodologies may struggle to account for these changes, potentially leading to outdated or irrelevant impact assessments.

The role of AI and technology in enhancing seascape assessment

AI and technology offer promising solutions to overcome some of the limitations of traditional SIA methods. AI can assist in creating more objective and consistent assessments by analysing large datasets to identify patterns and trends that may not be immediately apparent to human assessors. For example, Mott MacDonald has developed machine learning algorithms that are trained to detect trees, then determine whether they are Ash trees, and finally to determine whether these Ash trees are suffering from Ash Dieback. A similar algorithm could be developed to review historical mapping or photographic data and predict potential changes to seascape character bought about by coastal erosion or climate change, which could be used to determine existing and future baseline information for seascape character within an SCA and help inform SIA studies for developments.

Geographic Information Systems (GIS) and remote sensing technologies can provide up-to-date information on the physical characteristics of seascapes, allowing for more dynamic and responsive SCA and SIA studies. These technologies can track changes over time, providing a more accurate picture of the seascape's current and future baselines. Seascape assessment currently requires the study of the coast from an offshore perspective, which comes with costs and risks that are often not encountered in LVIAs. By utilising AI and remote sensing to gather and analyse data efficiently, the need for manual surveys could be reduced or eliminated.

Moreover, technology can facilitate stakeholder engagement by providing visualisation tools that can help people understand and interpret the potential impacts of developments on seascapes. Virtual reality and augmented reality can create immersive experiences that allow stakeholders (who may not be able to access boats or view the coast from offshore) to visualise changes in a more tangible way, potentially leading to more informed decision-making.

In conclusion, while traditional SIA methods in the UK face several limitations, the integration of AI and technology offers a pathway to more objective, consistent, and dynamic assessments. By leveraging the power of these tools, stakeholders can gain a better understanding of the potential impacts on seascapes, leading to more sustainable and informed management of marine and coastal environments.

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Artificial Intelligence Impact Assessment: the case for responsible AI adoption

Artificial Intelligence (AI) has made great strides in recent years, especially in the areas of machine learning, large language models, natural language processing, knowledge representation and generative AI. AI is already used extensively in industry, government, science and cultural production, but recent advances particularly in generative AI have led to an increased awareness of the potential for AI to be more widely adopted in industry, the public sector and work life more generally. This in turn has led to increasing concerns about the potential repercussions of more widespread AI use in terms of the robustness, safety and reliability of the technology itself, its lawful and ethical application, and its impact upon society and social wellbeing.

Numerous real-life instances of poor price prediction,[11] algorithmic discrimination in health care[12] and recruitment,[13] invasions of privacy,[14] copyright violation,[15] and automated payment systems[16] and the like have cost industry millions in corporate losses and legal redress, ruined corporate reputations, and raised the potential risks of implementing AI systems in public discourse. Academic research has demonstrated how the use of automated systems can lead to decisions that harm the poor, reinforce racism, and amplify inequality.[17,18,19] This not only has implications for corporate social and legal responsibilities, but for the wellbeing of society at large.

Such perceptions also create an overall lack of trust and acceptance of AI technologies among the public. A recent global survey by KPMG found 61% of respondents across 17 countries were wary about trusting AI systems, and a similar proportion were unwilling to accept the use of AI.[20] This varied drastically between countries, with Indian respondents most trusting at 75%, and Finns least trusting at 16%. Interestingly, willingness to accept AI was generally lower than trust, with less than 25% of Americans, Canadians, Australians, British, Dutch, Japanese and Finns willing to accept AI systems. This is clearly a barrier to innovation and the adoption of AI technologies moving forward.

One way to understand and mitigate the possible risks and problems associated with increasing AI adoption is to apply an impact assessment approach to AI, much in the same way that this has been applied to various other contexts such as the environment, human rights, social and data protection. Such an approach has been encouraged in academic literature.[21,22]

11 fortune.com/education/articles/what-zillows-failed-algorithm-means-for-the-future-of-data-science/.
12 www.nature.com/articles/d41586-019-03228-6.
13 www.theguardian.com/technology/2018/oct/10/amazon-hiring-ai-gender-bias-recruiting-engine.
14 www.nytimes.com/2012/02/19/magazine/shopping-habits.html.
15 hbr.org/2023/04/generative-ai-has-an-intellectual-property-problem.
16 www.bbc.co.uk/news/business-56718036.
17 O'Neil, C. (2016) *Weapons of math destruction: How big data increases inequality and threatens democracy*. London: Allen Lane.
18 Eubanks, V. (2017) *Automating inequality: How high-tech tools profile, police, and punish the poor*. New York: St. Martin's Press.
19 Noble, S.U. (2018) *Algorithms of oppression: How search engines reinforce racism*. New York University Press.
20 policy-futures.centre.uq.edu.au/files/16650/Trust%20in%20AI%20Global%20Report_2023_UQ.pdf.
21 Stahl, B.C. et al. (2023) 'A systematic review of artificial intelligence impact assessments'. *Artificial Intelligence Review, 56*, 12799–12831.
22 Calvo, R.A., Peters, D., & Cave, S. (2020) 'Advancing impact assessment for intelligent systems'. *Nature Machine Intelligence*, 2(2), 89-91.

Given these concerns, various governments and supra-national organisations such as the European Union,[23] European Commission,[24] the OECD,[25] the United Kingdom,[26,27] Canada,[28] and the United States[29] have adopted an impact assessment approach and begun to develop guidelines and principles for responsible and ethical AI and algorithmic application for the public sector and private industry to follow. Interest groups have begun to lay out various forms of AI impact assessment and governance frameworks, such as the Ada Lovelace Institute,[30] AI Now[31] and the Center for Long-Term Cybersecurity.[32] A small number of private organisations are also starting to advertise AI impact assessments as a service for clients considering adopting AI technologies into their businesses.

However, such guidelines are at an early stage of development, are only mandatory within public sector environments at best, and relatively unknown in private industry and the wider impact assessment community. At present, the AI impact assessment landscape is both fragmented[33] (in the sense that it lacks common standards), internally focussed (in the sense that the frameworks currently in place are based on self-evaluation), and narrow in scope (in the sense that they concentrate primarily on technological and legal risk management and play little attention to social risk management).

Surveying a wide range of AI impact assessment frameworks across government, private and non-profit sectors, it is found that most AI frameworks list as their primary concerns technological robustness and legal/ethical compliance. However, as wider adoption of AI starts to have a more substantial impact on our everyday lives, social and economic impacts stand to become more prominent, especially in terms of the transformation of employment and work and the risks involved with such a transformation. It is clear then that the developing field of AI impact assessment should not only address potential concerns around technological robustness, safety, legal and ethical concerns, but also the wellbeing of individuals, groups and larger society being affected by AI adoption. Corporate social responsibility in this context can include the economic, social and mental health impact on employees, greater polarisation of income and wealth, issues around equality and diversity, and impacts on customer, user or client relations.

AI impact assessment should not only address potential concerns around technological robustness, safety, legal and ethical concerns, but also the wellbeing of individuals, groups and larger society.

Repercussions of overlooking these responsibilities and potential risks can result in loss of trust, income and reputational damage for a company or organisation at a smaller scale, and widespread social disruption at a larger scale. Thus, this article argues that it is necessary to encourage and implement a widespread programme of AI impact assessment in the near future to encourage sharing the benefits of AI technology while mitigating the risks as much as possible. Such an approach will not only mitigate risk but clear the path for innovation and AI adoption in the long term.

23 www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS_BRI(2021)698792_EN.pdf.
24 ec.europa.eu/futurium/en/european-ai-alliance/ai-impact-assessment-code-conduct-0.html.
25 oecd.ai/en/catalogue/tools/algorithmic-impact-assessment-tool.
26 publications.parliament.uk/pa/cm5803/cmselect/cmsctech/1769/report.html.
27 www.gov.uk/government/publications/data-ethics-framework.
28 canada-ca.github.io/aia-eia-js/.
29 www.cio.gov/aia-eia-js/#/.
30 www.adalovelaceinstitute.org/resource/aia-user-guide/.
31 ainowinstitute.org/publication/algorithmic-impact-assessments-report-2.
32 cltc.berkeley.edu/wp-content/uploads/2021/08/AI_Risk_Impact_Assessments_BRIEF.pdf.
33 ecnl.org/news/eu-ai-act-must-have-standardised-methodology-impact-assessments.

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Assessing the impacts of UK commercial spaceflight

The successful launch of the first Earth orbiting satellite, Sputnik I, in 1957 marked a pivotal moment in history, igniting the space race and the exploration of space for the betterment of humanity. Access to space and use of space technology has a multitude of benefits: it is essential for advancing scientific knowledge, driving technological progress and it plays a fundamental role in monitoring and mitigating environmental issues on Earth.

UK commercial spaceflight and the regulatory framework

The UK Government, recognising the significance and benefits of space endeavours, has been actively developing is commercial spaceflight program. It has targeted a 10% share in the global space economy by 2030. Whilst this has the potential for great opportunities, it also brings forth environmental considerations that necessitate careful management. As the UK moves towards becoming an active rocket launching nation, it is critical that the impact assessments on the environment are tailored to the unique challenges posed by spaceflight activities.

The commitment to fostering a strong space industry is underpinned by the Space Industry Act 2018 (SIA).[34] The SIA provides a high-level regulatory framework that enables small rocket launches from the UK carrying satellites into orbit. In regulating these activities, the Civil Aviation Authority (CAA) has a primary duty to ensuring public safety. It also has the responsibility to take into account environmental effects through the careful review of environmental requirements outlined in the SIA.

Assessment of Environmental Effects

The Assessment of Environmental Effects (AEE), required under the SIA, ensures that both launch operator licence and spaceport licence applicants thoroughly consider the environmental effects of their proposed activities and take appropriate measures to mitigate the risks and their potential significant effects. The CAA's review of the AEE is integral to the licensing process, ensuring the AEEs are conducted rigorously and comprehensively. A key requirement of ensuing the AEE's quality and completeness is that they are undertaken by competent environmental experts.

The dynamic nature of spaceflight activities poses unique challenges for conducting environmental assessments. Rocket launches and spaceport operations have the potential to impact various environmental, population and human health features over vast spatial and temporal scales, presenting challenges for proportionate and realistic assessment.

The AEE must cover all operational activities that could have a significant environmental effect, identifying and assessing those effects on the environment in whatever location they occur. Factors such as atmospheric pollution, wildlife disturbance, noise and visual impacts must be carefully considered, along with the transboundary effects that extend beyond the immediate vicinity of the launch site and along rocket trajectories.

34 Space Industry Act 2018. Available at: www.legislation.gov.uk/ukpga/2018/5/contents/enacted.

Rocket launches and spaceport operations have the potential to impact various environmental, population and human health features over vast spatial and temporal scales, presenting challenges for proportionate and realistic assessment.

Licensing spaceports

Multiple potential spaceport locations have been identified across the UK, from Spaceport Cornwall in Newquay, which can facilitate horizontal launches and is an existing aerodrome, to the purpose-built spaceport locations in Scotland such as SaxaVord Spaceport and Sutherland Spaceport which will facilitate vertical rocket launches. Unlike many regulated activities, such as industrial installations or airports which have continuous operations, spaceports will facilitate activities and rocket launches intermittently. Therefore, spaceport AEEs are based on an environmental budget consisting of the total number of launches to be undertaken over multiple years and the frequency of those launches e.g., per year or per month. The AEE for a spaceport focuses on the operational activities only and does not extend to impacts relating to construction.

Accounting for flexibility and uncertainty

There may be uncertainties surrounding rocket launch parameters at the time of conducting AEEs. For example, for a spaceport licence application, launch trajectories, impact zones for dropped rocket stages and even launch vehicle parameters may not be known until a launch operator and payload (satellite) customers have been identified. Alternatively, a launch operator may want their AEE to be flexible to facilitate a range of rocket launches over time. It is important that the AEE strikes a balance between realistic assessment of effects and also adaptability. To account for flexibility, the AEE must be based on reasonable scenarios, for example impact zones can be based on areas akin to the 'Rochdale Envelope' approach used for Environmental Impact Assessments (EIAs).

Monitoring and reporting requirements may be attached to spaceport and launch operator licences to understand the actual impacts of the licensed activities. These requirements aim to mitigate uncertainties within the AEE and validate assumptions made. Monitoring data will enhance future AEEs and provide a deeper understanding of the impacts associated with these activities. This is particularly important in what is a relatively new area of impact assessment in the UK.

Cross-regulatory interaction

The AEE and licensing of spaceflight activities interact with other regulatory regimes, including planning and marine licensing. Applicants may be permitted, under the SIA, to utilise relevant assessments prepared under other enactments (or previous SIA applications), with a view to avoiding duplication of effort. For example, where a spaceport has undertaken an EIA to support a planning application, operational aspects of that EIA could be used as part of the AEE if appropriate. This is unique to this licensing regime and endeavours to streamline the regulatory process while maintaining environmental standards.

Figure 2. Rendered image of a launch from the licensed SaxaVord Spaceport.

Conclusion

On 9 January 2023 Virgin Orbit's launch from Spaceport Cornwall made history by becoming the first ever commercial rocket launch from Europe, proving the UK's launching capability. Since then, a spaceport licence has also been granted for SaxaVord Spaceport with a number of launch operator licences currently in determination. As the UK continues to pursue its ambitions in commercial spaceflight, environmental considerations must remain at the forefront of regulatory efforts. We must continue to understand and address the specialised requirements of impact assessments for UK spaceflight activities to mitigate potential environmental harm. Acknowledging and learning lessons from assessment challenges is going to be crucial in this evolving and interesting area of impact assessment.

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Due diligence in the supply chain and supply chain impact assessment: duties for EU and non-EU companies

Regulatory framework and best practices are rapidly changing all over the world. Moreover, European Union (EU) legislation is more and more pervasive, imposing duties on EU companies, as well as, to a certain extent, non-EU companies.

Indeed, based on the combination of a number of different provisions, companies are increasingly required to integrate due diligence into their policies and risk management system, as well as to identify (first by mapping their value chain), assess and prevent both their own negative impacts and those of their business partners in the supply chain.

Companies are increasingly required to integrate due diligence into their policies and risk management system, as well as to identify, assess and prevent both their own negative impacts and those of their business partners in the supply chain.

As far as the EU legislation is concerned, a 'sectorial' duty of due diligence is provided for by Regulation (EU) 2023/1115 (Regulation on deforestation-free products, or 'EUDR'), with the aim to promote deforestation-free supply chains, while taking into account the protection of human rights and the rights of indigenous peoples and local communities, both in the EU and globally. The due diligence system includes information requirements, risk assessment and risk mitigation measures, complemented by reporting obligations. EUDR does not exclude the application of other EU legal acts which lay down requirements concerning due diligence in the value chain.

Two pieces of legislation which go even further are the proposal of a Directive on Corporate Sustainability Due Diligence (CSDDD) and the EU's Corporate Sustainability Reporting Directive 2022/2464 (CSRD).

Firstly, CSDDD, which has been agreed (with great compromises) by the Council and has still to be adopted by the European Parliament, would require, *inter alia*, EU companies established in the Union with more than 1000 employees on average and a net worldwide turnover exceeding EUR 450 million in the last financial year for which annual financial statements have been or should have been adopted, to comply with due diligence. Moreover, CSDDD should apply to non-EU companies which generated a net turnover of at least EUR 450 million in the Union in the financial year preceding the last financial year. Furthermore, specific provisions concern groups of companies.

A company should take the appropriate measures to achieve the objectives of due diligence by effectively addressing adverse impacts in a manner commensurate to the degree of severity and the likelihood of the adverse impact. Account should be taken of the specificities of the company's business operations and its chain of activities, which should cover activities of a company's upstream business partners (related to the production of goods or the provision of services by the company), as well as activities of a company's downstream business partners (related to the distribution, transport and storage of the product).

To comply with due diligence obligations, companies need to take appropriate measures with respect to the identification, prevention, bringing to an end, minimisation and remediation of adverse impacts, and the carrying out of meaningful engagement with stakeholders throughout the due diligence process.

In other words, a company – as first steps – should identify (mapping their own operations, those of their subsidiaries and, where related to their chains of activities, those of their business partners) and then carry out an in-depth assessment of actual or potential (listed) adverse human rights and environmental impacts. They retain the documentation demonstrating their compliance for at least 5 years.

Secondly, CSRD, which needs to be implemented by Member States, amends Directive 2013/34/EU (the 'Accounting Directive') imposing obligations on the disclosure of non-financial information, including sustainability reporting. In particular, the key provision is the new article 19a of the Accounting Directive (as amended by CSRD), which requires (certain) companies to include in sustainability reporting a series of information necessary to understand both the company's impacts on sustainability matters and how sustainability matters affect the company's development, performance, and position (so-called 'double materiality'). Among the information required, there is the description of (i) the due diligence process implemented with regard to sustainability matters (i.e., environmental, social and human rights, and governance factors, including sustainability factors defined in point (24) of Article 2 of Regulation (EU) 2019/2088); (ii) 'the principal actual or potential adverse impacts connected with the company's own operations and with its value chain, including its products and services, its business relationships and its supply chain, actions taken to identify and monitor those impacts (...)'; and (iii) any actions taken by the company to prevent, mitigate, remediate or bring an end to actual or potential adverse impacts, and the results of such actions.

In this regard, the European Financial Reporting Advisory Group (EFRAG) has defined European Sustainability Reporting Standards (ESRS), which contain guidelines for drawing up a sustainability report. In particular, ESRS 1 requires companies to report not in relation to every single entity in the value chain, but only to those that are considered 'material': in this regard, see Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023.

At an international level, the United Nations Guiding Principles on Business and Human Rights (UNGPs) and the Organization for Economic Co-operation and Development (OECD) Due Diligence Guidance for Responsible Business Conduct (OECD Guidelines) must be mentioned: they are both cited by CSRD and require companies to identify, prevent, mitigate and account for how they address adverse impacts in their operations and supply chains.

The CSRD applies only to certain types of companies/groups, both EU (in particular, large undertakings) and (to a certain extent) non-EU. It should be noted that sustainability reporting, *inter alia*, allows banks and investors to determine where they allocate their investments and to whom they provide loans and under what terms.

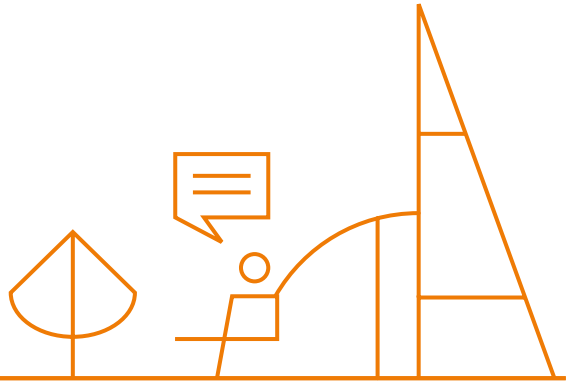
However, other (EU and non-EU) companies (including micro, small or medium-sized undertakings- SMEs) could be 'indirectly' affected by both the CSDDD and CSRD, as they are part of a supply chain. Therefore, they must equip themselves in the first place to be able to answer to the requests of data which the companies subject to CSDDD/CSRD will make on them to meet their own requirements, as well as to embark on a 'virtuous path' that will enable them to continue to be chosen as business partners by the mentioned companies.

Hence, an impact assessment of supply chains could be a useful (and, to a certain extent, new) tool for the abovementioned companies both to be competitive and to avoid misleading information and, consequently, avoid the risk of greenwashing. Moreover, the outcome of the mentioned impact assessment of supply chain could help companies understand their level of sustainability and incentivise them to review their procurement practices and business relationships, also adopting the needed actions on policies and contracts. Furthermore, it allows companies to identify their dependencies, impacts and risks throughout their supply chain, contributing to the avoidance of possible disruptions.

One of the forthcoming challenges is (and will increasingly be) defining, developing (and agreeing on) the approach, objectives and methodology of supply chain impact assessment. Indeed, such impact assessment should be tailored to specific situations, considering the position of the company in the supply chain, the complexity of the supply chain itself (starting by mapping the value/supply chain) and on the context of activities at stake (and, thus, be commensurate with the risk of adverse impacts), but should be carried out in a 'serious' way and based on robust evidence. In this regard, in addition to international standards such as the OECD Guidelines, other impact assessments, and, in particular, Environmental Impact Assessment (EIA) and Health Impact Assessment (HIA), could be taken as a reference.

In the context of the development of supply chain impact assessment, just as demonstrated by the experience correlated by the implementation of the aforementioned impact assessments, one important aspect to consider will be the engagement of relevant stakeholders (e.g., local communities), who could provide relevant information (e.g., on impacts).

The goal to be achieved is (quite) clear and has to do with the sustainability of global chains and a commitment and transparency in sustainability; all that remains now is to trace the path (in which supply chain impact assessment, once developed, will be of help).



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Land contamination assessment and Environmental Impact Assessment

I read with interest the UK Government's consultation on Environmental Outcomes Reports (EOR)[35] and particularly the statement on duplication: '3.8 The government is clear that EORs must not duplicate assessment activity carried out elsewhere in the development of the plans or projects within regimes subject to EOR.' This got me thinking more generally about land contamination in the existing EIA process, particularly in respect of duplication of effort.

Having worked on land contamination elements of Environmental Impact Assessment (EIA) over the past 18 years, I have often been intrigued by differing approaches and levels of assessment. There is currently no authoritative guidance on land contamination in EIA. The Design Manual for Roads and Bridges (DMRB)[36] guidance on Geology and Soils is arguably the closest thing that we have.

Contamination is presented in chapters with a variety of names including land quality, ground conditions, ground contamination as well as the more traditional 'geology and soils'. The fact that we can't agree a name for the section where land contamination sits is perhaps insightful.

Contamination is presented in chapters with a variety of names including land quality, ground conditions, ground contamination as well as the more traditional 'geology and soils'. The fact that we can't agree a name for the section where land contamination sits is perhaps insightful.

The EIA and land contamination regimes have two related but different focusses; for EIA this is to assess the likely significant effects of the proposed scheme and for land contamination it is the identification of unacceptable risks and confirm that a development site is suitable for its proposed use. Assessment methodologies that incorporate land contamination can differ quite widely from scheme to scheme. One approach uses the familiar EIA effects matrix of impact magnitude and receptor sensitivity. This was often confined to demonstrating the mitigation of negative effects, as if to make a point of, 'look, we're not going to make things worse'. This approach arguably lacks ambition from a discipline that is, at its heart, involved in improving the quality of land.

35 www.gov.uk/government/consultations/environmental-outcomes-reports-a-new-approach-to-environmental-assessment.
36 Design Manual for Roads and Bridges, LA 109 Geology and soils, 2019, www.standardsforhighways.co.uk/search/adca4c7d-4037-4907-b633-76eaed30b9c0

Anecdotally at least, this seems much less the case these days and is probably partly down to the use of a more risk-based approach advocated by contaminated land legislation and guidance for use in contamination assessments. This approach uses a predicted change in risk, via risk assessments with which land contamination professionals are familiar, at key project milestones as a predictor of effects and their magnitude.

As is the case with several impact assessment disciplines, with the application of mitigation, assessments tend to end up in similar places in terms of significance. Temporary effects are usually mitigated by measures embedded into a Code of Construction Practice (CoCP) or Construction Environmental Management Plan (CEMP). Permanent effects can be mitigated through the remediation of land contamination, and it is this aspect that interests me more. Specifically, that the embedded mitigation in this instance in England can comprise all the tiers of assessment and activities detailed in the Environment Agency's Land Contamination Risk Management (LCRM)[37] framework. This may be a simple ground investigation and generic risk assessment with no remediation required, all the way through to multiple phases of site investigation, detailed quantitative risk assessments and the application of multiple remediation technologies. With the application of LCRM, and the need for developments to be suitable for their intended use (usually secured via planning conditions), there should not be any significant permanent adverse effects from land contamination. There could still be some permanent beneficial effects where land is remediated, and while it is positive to be able to demonstrate these, one could question whether this on its own is a suitable justification for scoping the land contamination element into an Environmental Statement.

Why isn't this all dealt with at the EIA scoping stage we may ask, but unfortunately, as the EOR consultation notes, a fear of legal challenge can drive a risk-averse approach to assessment.

A peculiarity of land contamination in EIA is that the land contamination risk assessment, whilst outwardly relating to soil or groundwater quality, is measured by assessing risks to individual receptors e.g., surface water, groundwater, human health, but also ecological receptors or even the built environment. These receptors tend to be comprehensively covered elsewhere in their own Environmental Statement chapters although this extends much wider than the interface with land contamination.

Therefore, we can end up in a situation where a chapter titled Geology and Soils is reporting effects to, for example, groundwater, ecology and heritage that are substantially different to the effects considered in their respective chapters. Even where the differences in topic methodologies and different scopes of assessment are clearly signposted, I can imagine that this may still cause confusion among stakeholders.

So, what then is needed? Well, assuming business as usual for EIA, some authoritative guidance that can provide developers, practitioners and stakeholders with additional tools relating to assessment methodologies, topic crossovers and in particular the application of proportionality in EIA scoping would be useful. Perhaps highlighting that the well-established contaminated land regime, and now standard embedded construction mitigation, should mitigate risks (and adverse effects) effectively without the need for a separate impact assessment. This could let Geology and Soils chapters get back to simply reporting effects on geology and soil as resources and receptors in their own right.

37 Environment Agency (2020) Land Contamination Risk Management. Available at: www.gov.uk/government/publications/land-contamination-risk-management-lcrm.

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Designated heritage assets: harm vs. effect. Making EIA and planning policy compatible for designated heritage asset decision making

For those of us who love a legislation and policy puzzle, here's a fun one. I have been trying to find a solution for the last 10 years and as yet no one appears to have found a consistent approach, including conservation officers, heritage consultants, environmental consultants, lawyers or planning inspectors. The question is: in England, how do you produce a proportionate assessment of impacts to designated heritage assets (listed buildings, scheduled monuments, conservation areas, registered parks and gardens, protected wreck sites, registered battlefields, and world heritage sites) when you are working with both the Environmental Impact Assessment (EIA) regulations and English planning policy?

The problem is when a development requires an EIA the decision on acceptability is based on national and local planning policy. So, what are the competing assessment tests?

The Town and Country Planning (EIA) Regulations 2017, section 4(2), states:

> The EIA must identify, describe, and assess in an appropriate manner, in light of each individual case, the *direct and indirect significant effects* [emphasis added] of the proposed development.[38]

This means, where a development requires an EIA, the test is whether the proposed scheme causes a significant effect.

For designated heritage assets, the key policy test for an impact assessment is in paragraph 205 of the National Planning Policy Framework (NPPF) (with similar wording in the National Planning Policy Statements):

> When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation… This is irrespective of whether any potential harm amounts to *substantial harm, total loss or less than substantial harm to its significance* [emphasis added].[39]

38 www.legislation.gov.uk/uksi/2017/571/regulation/4/made
39 assets.publishing.service.gov.uk/media/65a11af7e8f5ec000f1f8c46/NPPF_December_2023.pdf.

Therefore, the policy test is the level of harm caused to the heritage asset's significance. This allows the decision maker to establish whether the public benefit of the scheme outweighs the harm and is therefore permissible.

How do we reconcile the policy test of level of harm with the EIA test of significance of effect in a proportionate way without carrying out two separate assessments?

So how do we reconcile the policy test of level of harm with the EIA test of significance or effect in a proportionate way without carrying out two separate assessments? We have good process-driven guidance for undertaking heritage impact assessments. However there is no specific heritage guidance on EIA issued by Historic England, Institute of Historic Building Conservation, Chartered Institute for Archaeology or an Institute of Environmental Management and Assessment working group. Several organisations have tried but it's understandable that it appears to have fallen into the too difficult box.

Best practice guidance often used for EIA, especially on large infrastructure projects, is the Design Manual for Roads and Bridges (DMRB)[40] which uses a generic matrix approach across a number of environmental topics (see Table 4 below, reproduced from LA 104 Environmental assessment and monitoring, DMRB, Page 15).

40 www.standardsforhighways.co.uk/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT&suite=DMRB

Table 4. Significance matrix reproduced from LA 104 Environmental assessment and monitoring, DMRB, p.15.

	Magnitude of impact (degree of change)					
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Environmental value (sensitivity)	**Very high**	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Table 5 below (Table 3.4N reproduced from LA 104 Environmental assessment and monitoring, DMRB, Page 14) uses the value (significance) of a designated heritage asset referenced against the magnitude of impact, established using generic impact assessment criteria.

Table 5. Magnitude of impact and typical descriptions, reproduced from LA 104 Environmental assessment and monitoring, DMRB, p.14.

Minor		**Typical description**
Major	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

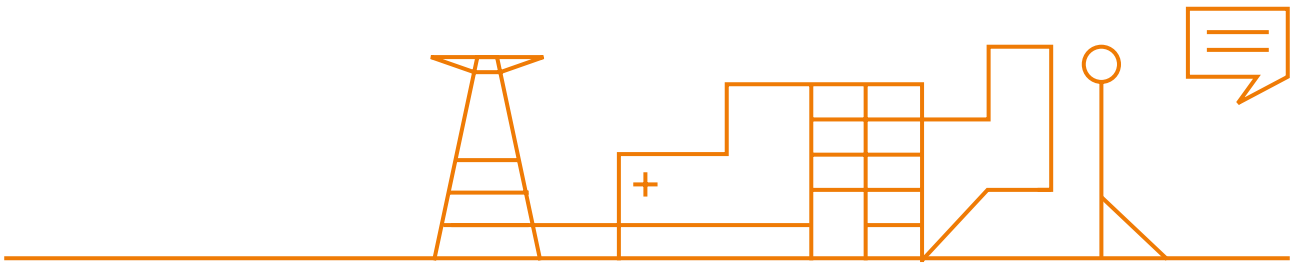
Heritage stakeholders are not keen on this approach as it does not allow for the detailed qualitative assessment recommended by impact assessment guidance to establish a clear level of harm, as required by the NPPF. It also does not give decision makers an explicit assessment of the level of harm which allows them to make an informed policy-based assessment on whether the scheme is acceptable.

There is the ability to adapt the magnitude of impact description to be more specific to a heritage impact assessment. Most historic environment EIA practitioners attempt to adapt the DMRB EIA impact guidance to take account of national policy and guidance. But even with adapted criteria there is no direct correlation between the level of effect established through the matrix and the level of harm (total loss, substantial harm and less than substantial harm) to the significance of the heritage asset required by the policy test.

In my experience, various solutions have been found for this but they involve almost having to reinvent the wheel for each EIA, negotiating an approach with stakeholders and decision makers. But on the same project one stakeholder may agree the approach, another may not, and it is up to the decision maker to decide whether the approach is valid. This introduces a level of risk into consenting and can prolong the already complex decision making process.

Solutions used have included: agreeing to only assess harm where there is significant effect to a heritage asset; agreeing specific heritage assets where a harm assessment will be undertaken; or undertaking an assessment of harm alongside the significant effect assessment for all designated heritage assets. All of these solutions need a secondary assessment to be undertaken, which does not feel like the 'proportionate assessment' required by paragraph 200 in the NPPF.

Somewhere in all this it feels like a combined approach could be developed, one which allows a direct correlation between levels of effect and levels of harm. It may be as simple as directly referring to levels of harm in the criteria for assessing magnitude of impact. It may require a new approach which is process driven, similar to impact assessment guidance, rather than the current matrix approach. For those optimists amongst us there is even the potential that by combining the two assessments we may get clearer indication on how to understand levels of harm. But that's for another article.



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Coastal energy project impact assessment

United Kingdom (UK) waters are home to a thriving energy sector which is rapidly growing as we seek to decarbonise the UK energy system. However, coastal energy projects will often involve complex interactions with the marine environment.

For example, seawater used as part of cooling processes will often require detailed modelling and specialist assessment whilst new built features may need to be considered in terms of landscape & seascape. As approximately 47% of UK inshore waters are part of the Marine Protected Area network,[41] interactions with designated habitats and species are commonly considered. Although relatively specialist, the assessment procedure is heavily informed by the Environmental Impact Assessment (EIA) process itself, UK energy infrastructure precedent, best-practice and industry guidance. Beyond this though, site-specific factors will drive various more bespoke assessments.

We are continuing to observe the effects of Climate Change around our coastline, whether this be increased storminess, sea level rise or erosion. The UK is leading the way when it comes to considering, assessing and, where required, mitigating new coastal infrastructure.

Considering the example of the Sizewell C project,[42] due to the planned lifetime of the project (at least 60 years), a detailed assessment of coastal geomorphology was undertaken. There are inherent challenges in predicting how anthropogenic influences will interact with the marine environment several decades into the future. For instance, there are no current computational modelling platforms available which can accurately synthesis the numerous complex environmental processes involved with coastal change so far into the future. Therefore, in order to understand how the project may interact with the marine environment in the future, an Expert Geomorphological Assessment (EGA) approach was employed.

As part of the EGA, several leading geomorphologists were convened to assess physical and scientific evidence for coastal processes, and to consider how the project will interact with the coastline several decades into the future. This involved professional specialists reviewing all available evidence (including modelling, where available) to agree a likely future trajectory for both coastal process and shoreline geomorphic evolution. The EGA considered the existing baseline and examined a range of plausible scenarios for coastal change. This process helped move toward a professional consensus among the individual specialists on the possible locations and coastal processes which could be materially impacted by the project.

41 jncc.gov.uk/our-work/about-marine-protected-areas/
42 www.sizewellc.com.

Figure 3. Coastal construction at Hinkley Point C. For Sizewell C, many of the lessons learned from HPC (Sizewell C's 'sister station') will help speed up development.

Local issues may dictate the requirement for highly-specialist impact assessment; whilst this is often driven by credible interests in managing infrastructure development, it can be complicated by a relative lack of standardised process.

This is just one example of a topic where local issues may dictate the requirement for highly-specialist impact assessment (IA); whilst this is often driven by credible interests in managing infrastructure development, it can be complicated by a relative lack of standardised process. Unlike EIA, which has a very clear and prescribed methodology, such specialist IA may be problematic due to a lack of standard operating procedures.

By adopting these general guiding principles, practitioners can help navigate through uncertainty:

1. '**Screening**' - defining the topic of focus (this is a useful step to confirm how and why some form of bespoke assessment is needed). This stage can also define criterion upon which a subject is assessed;

2. **Technical Engagement** – speaking openly with both terrestrial and marine regulators is helpful to understand what the crux of the concern is. Local policy drivers or marine plan requirements are useful at a strategic level but it is vital to narrow the focus on the actual localised concerns;

3. Coordination - where coastal energy infrastructure sits across both onshore and marine jurisdictions, there are various challenges in terms of consistency and 'ownership' of topic-specific issues. Key to the management of this is discussion with onshore and marine regulators–candid conversations about 'who will lead what' are vital. IEMA practitioners can also look to draw upon the guiding principles of the Coastal Concordat[43] (designed to help promote coordination and streamline development where infrastructure requires terrestrial and marine consent);

4. '**Scoping**' – much like the equivalent in the EIA process, this can help practitioners to hone in on the key themes requiring assessment. Building on engagement, this can be useful to keep the technical assessment lean. The potential for stakeholder interests to creep from being 'environmental' in nature to other commercial and technical fields is often greater in non-standard IA. The scoping stage can be a helpful reminder for all parties as to what is being assessed, why and what the underpinning legislative requirement is;

5. Technical Assessment – using the information gleaned from engagement and the agreed focus of the IA, assessment against criterion defined earlier. As a best-practice, it is often helpful to provide a conversion of conclusions to EIA significance terminology so that 'the headlines' are clear; and

6. Commitments – as the pace of coastal energy development increases due to the pressing Climate Emergency, the need for risk-based decisions will become even greater. In non-standard IA, there may be a residual requirement for monitoring or mitigation to ensure all parties are content with the project throughout the full lifecycle – this should be embraced.

I have worked on several infrastructure projects where unusual and unfamiliar IA has been required; by drawing on these six principles, it has been possible to navigate from a position of procedural uncertainty to a clear technical conclusion backed up by thorough technical assessment.

The evolving nature of the industry and pace of growth means that new, unusual and niche IA will be needed more and more. As well as embracing these challenges, I would encourage those in the IEMA community to share their learnings with industry colleagues. As well as often being genuinely interesting, this will help allow for lessons-learned to positively influence future development.

43 www.gov.uk/government/publications/a-coastal-concordat-for-england

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Bioregional Impact Assessment: a paradigm shift in environmental evaluation

Bioregional Impact Assessment (BIA) is an innovative approach to the evolution of traditional Environmental Impact Assessment (EIA). This article introduces the rationale for the new approach, provides a brief background to BIA, and summarises the key differences and advantages of BIA vis-à-vis EIA.[44]

What is BIA?

BIA is a bioregional approach to the theory and practice of impact assessment (IA). A bioregion according to Sale is, '...any part of the earth's surface whose rough boundaries are determined by natural characteristics rather than human dictates, distinguishable from other areas by particular attributes of flora, fauna, water, climate, soils, and landform, and by the human settlements and cultures those attributes have given rise to.'[45]

The term 'bioregionalism' is attributed to Allen Van Newkirk in 1975,[46] and was adopted by many environmentalists from the 1970s onwards, most notably by Peter Berg,[47] Raymond F Dasman, Gary Snyder and Stephanie Mills.[48] The concept continues to be used and has influenced the study of economics,[49] sustainable business models,[50] and institutions,[51] to name but three use-cases. In terms of a defining bioregional approach, it is difficult to provide a strict list of tenets, but the literature highlights concepts such as: a focus on place, ecological literacy (including conservation biology, ecosystems, biodiversity, etc.), interdisciplinarity and holism, stewardship and local communities, circularity, regenerative practices and permaculture, landscape-scale interconnectivity, cultural and ecological resilience, ecosystem-based prosperity, sustainability, and collaborative governance.

Why do we need BIA?

Starting with my own life-place, Southern England, the ecoregion where I live, we have no primary forest left and have lost most of our keystone species. In short, the ecoregion's status is classified as critically endangered by WWF.[52] Furthermore, according to the Environment Agency, 'Only 14% of our rivers meet Good Ecological Status under the Water Framework Directive: that figure has not changed since 2009.'[53] A recent review of the UK Governments flagship 25 year Environmental Improvement Plan by the independent environmental watchdog the Office for Environmental Protection summarises '[d]eeply, deeply concerning adverse environmental trends continue.'[54]

44 For more detail see Howard, R. A. (2024) *Bioregional Impact Assessment* (Forthcoming).
45 Sale, K. (2000/1991) *Dwellers in the Land: The Bioregional Vision*. Athens, GA: University of Georgia Press, p.55.
46 Taylor, B. (2000) 'Bioregionalism: An Ethics of Loyalty to Place' *Landscape Journal 19*, pp.50-72. DOI:10.3368/lj.19.1-2.50.
47 See Glotfelty, C. & Quesnel, E. (2015) *The Biosphere and the Bioregion: Essential Writings of Peter Berg*. Routledge.
48 Lynch, T., Glotfelty, C. & Armbruster, K. (2012) *The Bioregional Imagination: Literature, Ecology and Place*. Athens, GA: University of Georgia Press.
49 Scott Cato, M. (2012) *The Bioregional Economy: Land, Liberty and the Pursuit of Happiness*. Routledge.
50 www.bioregional.com
51 Cook, H., Benson, D., & Couldrick, L. (2016) 'Partnering for bioregionalism in England: a case study of the Westcountry Rivers Trust' *Ecology and Society 21*(2).
52 www.worldwildlife.org/ecoregions/pa0421.
53 environmentagency.blog.gov.uk/2020/10/02/the-state-of-our-waters-the-facts.
54 www.theoep.org.uk/report/government-remains-largely-track-meet-its-environmental-ambitions-finds-oep-annual-progress.

Recent efforts by the UK Government to reform planning and the environmental assessment regimes have been brought forward under the Levelling Up and Regeneration Act (2023),[55] which includes powers to revoke the EIA and Strategic Environmental Assessment (SEA) legislation and replace it with a new system of Environmental Outcomes Reports (EORs). However, these new proposals have been strongly criticised by experts and stakeholders as poorly researched, failing to address existing issues, and reducing environmental and social protections.[56,57]

Therefore, the time for innovative proposals is at hand, and BIA has the potential to provide a paradigmatic shift in how we view the assessment of the impact of development on people and the environment.

The time for innovative proposals is at hand, and Bioregional Impact Assessment has the potential to provide a paradigmatic shift in how we view the assessment of the impact of development on people and the environment.

How does BIA differ from traditional EIA?

The table below sets out a high-level comparison between EIA and the new approach of BIA.

Table 6. A high-level comparison of EIA and BIA.

Aspect	Bioregional Impact Assessment	Environmental Impact Assessment
Scope	Considers how to integrate development into the unique ecological, social, and cultural characteristics of places.	Focus on environmental effects and minimum legal compliance. Social, health, wellbeing and cultural effects less prominent.
Scale	Considers impacts at a broader bioregion and ecoregion scale, considering larger ecosystems and interconnections.	Primarily concentrates on the local project area and its immediate adjacent surroundings.
Timeframe	Emphasises long-term vision and considers impacts on community and place, taking a generational perspective.	Primarily focuses on short- to medium-term impacts during the project construction and operation.
Holistic Approach	Considers complex, interrelated factors such as ecology, culture, and social systems, aiming for holistic solutions.	Primarily addresses individual environmental components, typically in siloed or stand-alone assessments, with less emphasis on interactions and interrelationships.
Community Involvement	Encourages active participation of local communities in decision-making processes, valuing traditional knowledge.	Public consultation is often driven by legal compliance and is more informative and consultative than participatory.
Monitoring	Independent audit of mitigations and community involvement during construction and operation.	Often limited monitoring. Enforcement of conditions and mitigations is typically weak and is often self-regulated by developers.

55 www.legislation.gov.uk/ukpga/2023/55/enacted.
56 www.theoep.org.uk/report/environmental-assessments-are-not-effective-they-should-be-due-practical-barriers.
57 www.iema.net/resources/blog/2023/06/09/iema-responds-to-governments-environmental-outcomes-consultation.

Aspect	Bioregional Impact Assessment	Environmental Impact Assessment
Cumulative Effects Assessment	Evaluates cumulative and cascading effects of multiple projects within a bioregion, over time and considers carrying capacities and limits to growth.	Focuses narrowly on cumulative effects of current projects with sufficient information to consider. Does not capture broader regional impacts comprehensively and fails to consider cumulative impacts over time (shifting baseline).
Collaboration Beyond Boundaries	Promotes collaboration among stakeholders, transcending project boundaries for regional sustainability. Seeks to bring an integrated cross-sector partnership approach to ensure transboundary and ecosystem nature of impacts addressed.	Developer-led with limited collaboration. Typically, engagement is limited to legal requirements for consultation and is limited to statutory bodies and the project's immediate stakeholders. Often no emphasis on regional or cross-sector collaboration.
Enhancement versus Mitigation	Shifts the focus from impact mitigation to impact avoidance and enhancement, seeking to leave places and the wider bioregion better than before. Seeks to demonstrate compatibility with, and contribution to, a sustainable bioregion.	Primarily focuses on addressing negative impacts through mitigation measures (including offsetting and compensation). Relies on 'planning balance' to justify trade-offs between positive and negative effects. Typically focused on demonstrating minimum legal and procedural compliance.
Resilience and Adaptability	Prioritises building resilience into regional systems and communities. Adopts adaptive management strategies to respond to changing conditions and incorporate feedback.	Typically interprets resilience and adaptability more narrowly, for example regarding mitigating major accidents, or adapting designs to climate projections.
Decision Making	The conclusions of the assessment should carry great weight with the decision maker. Findings of significant harm to the unique cultural, ecological and social characteristics of places and their host bioregion should mean that a plan or proposal is not given permission to proceed.	Currently the EIA is one factor considered by decision makers, but often does not carry great weight, particularly in comparison to economic considerations. Numerous examples exist of decisions being granted by Secretaries of State, despite the assessments predicting multiple significant adverse effects (and the reverse). Decision making is therefore often politically driven rather than based on the impact assessment.

In conclusion, BIA draws on the existing concept of bioregionalism to reimagine the theory and practice of IA to contribute more effectively to the delivery of enhanced social, cultural and ecological outcomes. As sustainability and impact assessment professionals we can, and must, reimagine our planning and impact assessment systems to help create truly sustainable bioregions that are culturally vibrant, socially just, economically prosperous, and ecologically thriving. The alternative is apparent from the status quo, and demonstrably worse for people and nature.

Do you make effective use of ALL of IEMA's IA member resources?

IEMA's website contains a treasure trove of IA-related content, as well as information about IEMA's volunteer network groups, blogs, webinars and policies. But not everyone makes the most of this free member content, including:

- Future events and webinars.
- Recordings of past webinars, with over 24 hours' worth of IA content.
- IA guidance & advice: such as the recent guides on Digital Impact Assessment, Traffic and Movement, Land and Soils, GHGs, and health in EIA.
- The Proportionate EIA Strategy.
- Over 400 EIA articles and 200 case studies related to EIA, developed by Q Mark registrants in recent years.
- Individual and organisational recognition specific to EIA, through the EIA Register and EIA Quality Mark schemes respectively.
- Opportunities to get involved with:
  - IA Steering Group
  - IA Network and Working Groups
  - Geographic/Regional Groups.

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Summary

The range of IA discussed in this Journal Volume just scratches the surface of the diversity of impact assessments out there, which is still growing in order to manage new environmental and social risks (for example, into new sectors) and risks that have not been assessed before.

Digital is a clear theme running through IA at present and there are valid discussions of both the opportunities and the considerations to ensure the benefits are as intended. Artificial intelligence and digital tools in general represent a paradigm shift in how we do our jobs and how we protect the environment, and it is up to us to retain a critical perspective and keep talking to each other about best practice and about the future.

What is also clear from the contributions here is that the impact assessment community have a strong desire to improve practice in their respective professions, whether this be in respect of proportionality, trust, efficiency, robustness, or accessibility. There are many ideas of how this could be achieved in these pages. The practical suggestions made here can also be considered and applied elsewhere, providing many practical benefits to sharing experiences and lessons learnt. Some improvements have already been made to mainstream impact assessment through developing assessment approaches for new sectors.

The necessity to develop new impact assessment frameworks, methodologies and guidance has never been more important, particularly in the light of the possible incoming Environmental Outcome Reports in England. The frontier of impact assessment is moving further away from what we might regard as 'traditional' EIA, and it is the people writing and reading the articles here who will be at the forefront of shaping impact assessment by seeking innovative solutions for a sustainable future.

I hope you have found reading the articles an enlightening experience. If any article has sparked your imagination, please reach out to the author, or myself as guest editor, to continue the conversation. LinkedIn details have been provided where available to assist in continuing the conversations online.

It has been a valuable and fascinating experience being guest editor of this Outlook Journal. Thank you to all the contributors for making this publication possible by volunteering their valuable time and sharing their expertise to raise awareness and inspire fellow professionals.

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IEMA's EIA Quality Mark – A scheme operated by the Institute allowing organisations (both developers and consultancies) that lead the co-ordination of statutory EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed. Founded in 2011, the EIA Quality Mark is a voluntary scheme, with organisations free to choose whether they are ready to operate to its seven EIA Commitments: EIA Management; EIA Team Capabilities; EIA Regulatory Compliance; EIA Context & Influence; EIA Content; EIA Presentation; and Improving EIA practice.

Impact Assessment Frontiers Part 1: Environment, Technology and Place

This twentieth edition of the Impact Assessment Outlook Journal provides a series of thought pieces on impact assessment databases, seascape assessment, Artificial Intelligence impact assessment, land contamination assessment, assessment of UK commercial spaceflight, designated heritage asset decision making, coastal energy project impact assessment, supply chain impact assessment, and bioregional impact assessment. In this edition, the Guest Editor, Samantha Timbrell, has selected nine articles produced by IEMA professionals and EIA experts. The result is a valuable yet quick read across some of the different aspects of UK and international practice exploring different types of Impact Assessment.

About the Guest Editor: Samantha Timbrell (she/her)

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Samantha Timbrell has over 17 years of experience in Impact Assessment (IA) managing environmental risks and identify improvement opportunities to support informed decision making. Her IA project and strategic experience focuses on flood risk management (including natural flood management), railway transportation, and the UK spaceflight sectors. Sam is currently a Senior Associate at Mott MacDonald, having previously worked for the Environment Agency and RPS, and sits on the IEMA IA Steering Group.

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We also help and support public and private sector organisations, governments and regulators to do the right thing when it comes to environment and sustainability related initiatives, challenges and opportunities. We work to influence public policy on environment and sustainability matters. We do this by drawing on the insights and experience of our members to ensure that what happens in practice influences the development of government policy, legislation, regulations and standards.

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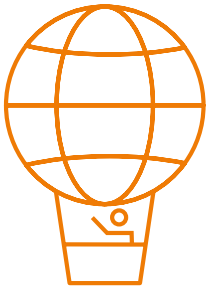

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