Attachment 4.5:
Water Framework Directive

A MISSING-Link between continental shelves and the deep sea: Addressing the overlooked role of land-detached submarine canyons.

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The principal aims of the Water Framework Directive (WFD), outlined in Article 4, require Member States to use River Basin Management Plans and associated Programmes of Measures to protect and, where necessary, restore water bodies so that they achieve good ecological and chemical status and avoid deterioration. This includes maintaining both the qualitative and quantitative condition of waters—reducing pollution, preventing further degradation, and ensuring sufficient water availability to support both ecological and human needs.

Attachment 4.3 evaluates the potential effects of the proposed project on the receiving environment. It concludes that, given the limited scale and nature of the activities, no impacts on any receiving waterbody are anticipated. This finding is supported by the fact that the vessels will be MARPOL-compliant and therefore have no realistic potential to cause water-quality deterioration. Additionally, no other project-related activities have been identified that could result in adverse effects on water quality.

This document was prepared by Dr Michael Clare, Dr Isobel Yeo, Professor Veerle Huvenne, Dr Rob Hall, Mr Alan Evans and Mr Guy Dale-Smith.

Dr Michael Clare is a Principal Researcher and the Mission Network Lead for Hazards and Pollution at the National Oceanography Centre, Southampton, where he has worked since 2015, before which he was a specialist in Offshore Survey and Marine Geohazards for FUGRO. His work focuses on sediment-transport dynamics, submarine geohazards and deep-sea systems. He has served as Marine Scientific Adviser to the International Cable Protection Committee since 2020. Dr Clare has led and co-led offshore monitoring campaigns in submarine canyon settings, including work in Congo and Whittard canyons that deployed moorings instrumented with Acoustic Doppler Current Profilers (ADCPs) to record turbidity currents and bottom-current variability. He is also involved an expert in the acquisition, processing and integration of multibeam bathymetry, side-scan–style acoustic seafloor mapping and sub-bottom profiling with moored and seabed sensors to characterise seafloor processes and risks to infrastructure.

Dr Isobel Yeo is a Senior Researcher at the National Oceanography Cnetre, specialising in Marine Geohazards, with over 15 years experience working in Marine Geology research. Her work has focused on using hydrographic survey methods and bottom sampling to map hazardous phenomena and sampling of rocks and sediments to characterize hazards and recreate timelines. She has extensive experience working with Autonomous Underwater Vehicles (AUVs) and Remotely Operated Vehicles (ROVs) to acquire data and samples across all seafloor depths. She has worked closely with AUV teams, including on mission design and execution. She has been the Chief Scientific Officer on three expeditions (two onboard British Vessels) and has participated in 20 scientific seagoing expeditions.

Professor Veerle Huvenne is a Principal Researcher at the National Oceanography Centre, Southampton. She has over 20 years of experience in marine habitat mapping and benthic ecology, her work spans cold-water corals, submarine canyon systems and deep-sea benthic communities. She has participated in more than 25 international expeditions—often acting as Chief Scientist or scientific lead—and has spent in excess of 900 days at sea. Her work uses multidisciplinary approaches to integrate geological, geophysical and biological methods (e.g., ROV/AUV video imagery, sediment cores, multibeam bathymetry, sidescan sonar and habitat classification) to characterise complex deep-sea ecosystems and the dynamic processes that govern them.

Dr Rob Hall, Professor in Physical Oceanography at the Scottish Association of Marine Science. Dr Hall holds a PhD in Physical Oceanography and has over a decade of experience in shelf-sea and deep-ocean fluid dynamics, internal tide and wave processes, sediment

transport and mixing, drawing on both observational deployments (including autonomous underwater vehicles and gliders) and numerical modelling. He is has expertise in marine hydrodynamics, sediment transport and benthic-habitat interactions in the Celtic Sea.

Mr Alan Evans serves as Head of Marine Policy at the National Oceanography Centre (NOC) in the UK and acts as a Marine Science Policy Adviser, bringing over two decades of experience in marine science, technology, and policy underpinned by a strong geoscientific background. At NOC, he leads the organisation's engagement with the global marine community through participation in international fora, bilateral partnerships, collaborative projects, and interactions with national governments—including UK Overseas Territories—and regional institutions. His expertise includes extensive application of the United Nations Convention on the Law of the Sea (UNCLOS), covering baseline and maritime-zone definition, continental-shelf delineation beyond 200 nautical miles, the mandate of the International Seabed Authority (ISA), and the enabling of marine scientific research and technology transfer. Internationally, Alan serves as the Alternate Head of the UK delegation to UNESCO's Intergovernmental Oceanographic Commission (IOC-UNESCO), where he chairs the Group of Experts on Capacity Development. He also contributes as a technical expert on the ISA Partnership Fund Board and previously advised the ISA/UN-OHRLLS "Women in Deep-Sea Research" initiative. Additionally, he represents NERC-UKRI at the European Marine Board, where he is vice-Chair.

Mr Guy Dale Smith serves as Head of Research Ship Operations at the National Oceanography Centre (NOC) in the UK, where he leads the planning, execution and oversight of marine research vessel campaigns and associated infrastructure, drawing on extensive maritime and operational experience. With a deep background in ship-based science support, Guy manages not only the logistics and safety of ocean-going missions but also the strategic alignment of NOC's fleet with scientific goals, ensuring that vessel operations maximise research impact while adhering to rigorous standards of marine safety and efficiency. His role spans coordination across multidisciplinary teams, vessels and international collaborations, forging strong relationships with science teams, engineering groups and external stakeholders to support downward-looking research in challenging marine environments.