Wave Hub Marine Safety System Manual

Contents

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1 An Overview of the Wave Hub Marine Safety System

The Marine Safety Management System utilises a set of minimum requirements named Marine Operation Requirements (MORs) for setting out how operations at the Wave Hub offshore site are to be managed safely. These essentially set out the legal framework, minimum standards and levels of co-operation required to ensure a safe site for all users. The Permit to Operate system ensures that appropriate MORs and standards are appropriately applied to all Contractor or Developer operations on site.

A summary chart showing the critical roles and responsibilities of all key parties is provided in MOR-021. An overview of permit application, the safety management requirements behind the permits and the interfaces with Wave Hub Limited (WHL), the Wave Hub operating company, for both Developers and Contractors is shown in MOR-016 and MOR-017 respectively. More specifically for Developers, the Device physical connection, physical disconnection and switching processes, which include elements from both the Wave Hub Marine and Electrical Safety Systems, are presented in MOR-022, 025 and 026.

The absolute legal duties that all Operators (*implying either Developers or Contractors*) must always comply with, are those identified by the legal framework (particularly the Health and Safety at Work Act 1974, the Management of Health and Safety at Work Regulations 1999, and the Merchant Shipping Act 1995). These notably include requirements to:

- competently risk assess all activities to identify and mitigate or control hazards as far as is reasonably practicable
- use only well trained and competent personnel and fit for purpose equipment
- preparation of and training in emergency response plans

These more generic work place duties imposed and enforced through UK legislation are added to by WHL site and activity specific safety requirements enforced through legal agreements or contracts with all permitted Operators.

The Construction Design Management (CDM) 2015 Regulations came into force on 6th April 2015. All offshore marine renewable energy projects are now subject to these regulations. Under these regulations, a project Developer will need to identify the:

- Client
- Principal Designer

- Principle Contractor.

The Developer is responsible for all documentation and notifications to the HSE under these regulations. The amount of documentation required under these regulations is, in general, commensurate with the scale of the project. Guidance on the updated CDM Regulations is available from the HSE website: http://www.hse.gov.uk/construction/cdm/2015/index.htm. Post construction, the Health and Safety file for the project must be shared with WHL and will form part of an overall Health and Safety File for the site.

It should be noted that the site and activity specific MORs are not exhaustive and generally sit alongside the accepted industry best practice guidelines: **Renewable UK 2014 Marine Energy Health and Safety Guidance**. The guidance is non-binding in nature but, in practice, the HSE is likely to treat this as the minimum standard that duty holders should be working to (where they are relevant). Of note to Developers is the guidelines' highlighting Device access and egress out at sea as a high-risk activity. It is therefore imperative that safe access is designed for and that method statements for access and egress are fully developed and subject to rigorous risk assessment prior to implementation.

The **Wave Hub deployment site** is defined on Admiralty Charts of the area as the Wave Hub 'Renewable Energy Development Area'. The Wave Hub deployment site is a grid-connected and fully consented site for the pre-commercial demonstration of marine renewable energy technology. Wave Hub was purpose built to provide Developers with the opportunity to demonstrate and prove their technology over several years on a site within a realistic, monitored and well-understood marine environment. The deployment site is located approximately 10 nautical miles (16km) offshore from Hayle on the north coast of Cornwall and measures approximately 4km x 2km in size.

The Wave Hub deployment site is connected to the shoreline beach joint via a live 33kV subsea power cable, approximately 25km long and presented on all UKHO admiralty charts of the area. It is buried wherever possible inshore. Further offshore the export cable is protected with a rock berm. At the termination of the main subsea export cable offshore is the 'Wave Hub' – a Subsea Cable Junction – also covered by a rock berm and at the centre of the consented and charted **Wave Hub safety zone** (500m diameter) in the south west corner of the Wave Hub deployment site. Radiating out from the 'Wave Hub' junction across the Wave Hub deployment site (to facilitate accessible developer electrical connections) are four live 33kV subsea cable tails of varying length. These subsea cables are stabilised by

rock bags but are otherwise unprotected to ensure ease of cable lifting and relocating as Developers connect. The **Wave Hub offshore infrastructure** encompasses all Wave Hub marine assets including the Wave Hub aids to navigation and the complete Wave Hub subsea power cable system.

Throughout the Marine Safety System, the term **Wave Hub offshore site** (or **site**) encompasses the Wave Hub deployment site, safety zone and offshore infrastructure i.e. any marine work-site in connection with Wave Hub.

There are a number of forms and management processes that support the marine safety system in both the permitting and operational phases. Where operational, WHL forms are offered, a Contractor or Developer equivalent (that the Operator may be more familiar with) may be accepted but in all cases the WHL requirements should be considered the minimum.

The co-operation and co-ordination between permitted site users will be primarily facilitated through the Wave Hub *Operations Planning And Notification System* (OPANS). WHL will, where necessary, arbitrate on matters of operational priority. In the first instance, the responsibility for advanced co-operative planning and SIMOPs management lies with the marine co-ordinators or operations managers for each of the Operators concerned. In general, effective inter-Operator planning, communication and cooperation should seek to avoid SIMOPs occurring.

Vessel masters are ultimately responsible for the safety of their vessels under maritime law and as such should always be consulted during the operation planning process. As a multi-user site, good communication with other Operators as well as with WHL through both the advanced planning and during any active operation is essential. This requirement is also highlighted in the Berthing Agreement and Inter-Developer Agreement.

WHL will not actively manage or co-ordinate Developer activity day to day, as Developers are wholly responsible for safety and infrastructure within their sublet sites, but will maintain a site safety overview and only step in where matters require. WHL will monitor that all users are acting professionally in respect of their duties on site as set out in the MORs and more generally under UK legislation.

Whilst WHL will maintain an overview of health and safety management across the entire site, WHL shall not be responsible for externally assessing or auditing Developer safety performance. Instead, WHL encourages Developers with sublet sites to pro-actively monitor safety performance as well as submitting safety data to Renewable UK's RISE (Renewable Industry Safety Exchange) database to help drive industry benchmarking and improvement: http://www.renewableuk.com/page/RISE.

The WHL emergency response function is currently the responsibility of the Wave Hub Duty Manager who has access to all up to date safety information, emergency contacts and remote SCADA access to shut-down the entire offshore electrical system. The WHL Managing Director, Head of Operations and Electrical Engineer shall all, where necessary, support in the latter stages of an emergency to ensure that safety notices are issued, the necessary controls are applied and swift and appropriate corrective actions are implemented. The WHL Marine Emergency Response Plan (ERP) details the processes to be followed by the Wave Hub Duty Manager. For Wave Hub offshore infrastructure related emergencies (subsea export cable system and aids to navigation), the Wave Hub Duty Manager is the key contact with the Coastguard and the Wave Hub Marine ERP applies. For permitted Operator (Developer or Contractor) operation or infrastructure emergencies offshore, the Operator Duty Manager is the primary contact with the Coastguard and the relevant Operator ERP applies. In this latter case, the Wave Hub Duty Manager function is limited to communications support (informing other site users) and monitoring.

The Wave Hub Renewable Energy Development Area has been well surveyed with multibeam bathymetry, video, side scan sonar, sub-bottom profiling, vibrocore and magnetometer data and interpretation available. It is the responsibility of the Operator concerned to assess the existing data available, and collect new data if necessary, to fully understand and risk assess the seabed areas of interest prior to infrastructure deployment.

The following sections present the documents that make up the Wave Hub Marine Safety System (MSS) and clearly show to whom the documents apply.

2 Wave Hub Marine Operations Permits

MARINE OPERATIONS PERMITS	APPLIES TO:		
PERMIT TITLE:	**WHL**	**Contractor**	**Developer**
FORM-M014 Developer Permit to Operate			
FORM-M015 Contractor Permit to Operate			
FORM-M016 Permit for Special Operations			

The Developer Permit to Operate should be used for a "Developer" under-leasing a site on the Wave Hub deployment site for "Device" demonstration (*implying singular or multiple renewable energy generating units and all associated offshore infrastructure*) and associated operations support. It covers validation of proposed equipment, safety management and emergency response arrangements and routine or minor O&M activities for the agreed project duration (subject to annual documentation review and re-validation).

Under a Developer's Permit to Operate, any major, complex or higher risk offshore works requiring greater levels of safety clearance and inter-Operator co-operation will always require advanced notification and in most cases further control through application of a Permit for Special Operations. This sub-permit may include a wide range of potential Developer operations under the following broad activity headings:

- Device Deployment
- Major Device Maintenance or Alteration
- Diving Operations
- Device Decommissioning

Particularly, Developer works that include handling of Wave Hub Subsea Cables and Connectors must always be authorised by WHL through a Permit for Special Operations under the relevant operation category above.

The application of a Permit for Special Operations will always be at the discretion of WHL. Regularly repeated major operations may ultimately be exempted from this permit after being well planned and safely completed at least three times successively - the operation may then be specified and endorsed on the main Permit to Operate and safety monitored as routine works (noting that any safety incident subsequently occurring may result in re-instatement of tighter controls once again).

The Contractor Permit to Operate should be used for any controlled Contractor operations on the Wave Hub offshore site. Operations may be contracted either by WHL or by a prospective Developer (prior to issue of a Developer Permit to Operate e.g. prospective geotechnical or geophysical investigations etc.). To ensure effective change management of a Contractor's activities, variations shall only be formally agreed in the manor prescribed by the Contract (Form-M005 for WHL Contractors) once the amended plans have been validated by WHL and noted on the Contractor Permit to Operate.

3 The Marine Operation Requirements

MARINE OPERATIONS REQUIREMENTS (MOR)	APPLIES TO:		
MOR REFERENCE / TITLE:	**WHL**	**Contractor**	**Developer**
MOR-001-Device Installation or Decommissioning			
MOR-002-Device and Mooring Design			
MOR-003-Wave Hub Cable and Connector Handling			
MOR-004-General Purpose Vessels and Manning			
MOR-005-Moored Vessels or Platforms			
MOR-006-Dynamic Positioning Vessels			
MOR-007-Device Support Operations			
MOR-008-Offshore Site Safety			
MOR-009-Offshore Site Access Procedures			
MOR-010-Emergency Response Requirements			
MOR-011-Diving and ROV Operations			
MOR-012-Notice to Mariners			
MOR-013-Offshore Contractor Operations Management			
MOR-014-WHL Personnel Access Offshore			
MOR-015-Working with Research Organisations			
MOR-016-Developer Safety Management Requirements			
MOR-017-Contractor Safety Management Requirements			
MOR-018-WHL Offshore Site Safety Management Process			
MOR-019-Reportable Incidents and Accidents	WHDM		
MOR-020-WHL Marine Emergency Response Plan	WHDM		
MOR-021-Roles and Responsibilities Overview			
MOR-022-Device Deployment and Physical Connection			
MOR-023-Geotechnical Investigation and Subsea Drilling			
MOR-024-Wave Hub Aids to Navigation Maintenance			
MOR-025-Device Removal and Physical Disconnection			
MOR-026-Operational Switching and Offshore Working			

4 Marine Operation Forms

FORMS	APPLIES TO:		
FORM REFERENCE / TITLE:	**WHL**	**Contractor**	**Developer**
FORM-M001 WHL Contractor HSEQ Questionnaire			
FORM-M002 SIMOPs Communications Plan Template			
FORM-M003 Maritime Safety Information			
FORM-M004 Permit Log			
FORM-M005 WHL Contract Variation Forms			
FORM-M006 WHL Daily Progress Report			
FORM-M007 Accident-Incident Report	**WHDM**		
FORM-M009 Non-conformance and Hazard Report	**WHDM**		
FORM-M010 Offshore Site Access Log			
FORM-M011 WHL Offshore Visitor Form			
FORM-M012 WHL Toolbox Talk Form			
FORM-M013 WHL RAMS Template			
FORM-M014 Developer Permit to Operate			
FORM-M015 Contractor Permit to Operate			
FORM-M016 Permit for Special Operations			
FORM-M019 Notice to Mariner Contact Schedule			

4.1 Live Registers and Operation Logs

Two of the forms are updated regularly and maintained as 'live registers', these are the Permit Log and Notice to Mariner Contact Schedule. The Access Log provides a means for an Operator recording site activity and critical safety information cumulatively if OPANS is unavailable or unsuitable.

Marine Operation Logs - LIVE	APPLIES TO:		
LOG REFERENCE / TITLE	**WHL**	**Contractor**	**Developer**
FORM-M004 Permit Log			
FORM-M019 Notice to Mariner Contact Schedule			
FORM-M010 Offshore Site Access Logs (*User Specific*)			

5 Data Sharing and Feedback

The Wave Hub Marine Safety System Safety Manuals, Operation Requirements, Guidance Documents and Supporting Forms are shared as defined above on the WHL Box File Sharing System along with all other relevant design and operational information. This information collectively constitutes the pre-construction information under CDM 2015. This file share is constantly maintained and updated and Developers and Contractors are advised to work from the latest versions available on Box. Please do not rely on old downloaded data that is likely to have been superceded. *WHL will not be held liable for any reasonable change to safe working systems and requirements at any time.*

Operator feedback, comments and requests for clarifications on safety management at Wave Hub are welcomed and should be sent to the WHL Head of Operations.

Appendix A – Marine Operation Requirements

MARINE OPERATION REQUIREMENTS (MOR)
MOR-001-Device Installation or Decommissioning
MOR-002-Device and Mooring Design
MOR-003-Wave Hub Cable and Connector Handling
MOR-004-General Purpose Vessels and Manning
MOR-005-Moored Vessels or Platforms
MOR-006-Dynamic Positioning Vessels
MOR-007-Device Support Operations
MOR-008-Offshore Site Safety
MOR-009-Offshore Site Access Procedures
MOR-010-Emergency Response Requirements
MOR-011-Diving and ROV Operations
MOR-012-Notice to Mariners
MOR-013-Offshore Contractor Operations Management
MOR-014-WHL Personnel Access Offshore
MOR-015-Working with Research Organisations
MOR-016-Developer Safety Management Requirements
MOR-017-Contractor Safety Management Requirements
MOR-018-WHL Offshore Site Safety Management Process
MOR-019-Reportable Incidents and Accidents
MOR-020-WHL Marine Emergency Response Plan
MOR-021-Roles and Responsibilities Overview
MOR-022-Device Deployment and Physical Connection
MOR-023-Geotechnical Investigation and Subsea Drilling
MOR-024-Wave Hub Aids to Navigation Maintenance
MOR-025-Device Removal and Physical Disconnection
MOR-026-Operational Switching and Offshore Working

Marine Operations Requirement (WAVE HUB-OMS-MOR-001)

Device Installation or Decommissioning

WHL minimum requirements including compliance with the OMS, ASMS, RUK Safety Guidelines, HSWA, MHSWR, CDM and EWR should be incorporated into the device installation or decommissioning plan.

Requirement	Details
Marine Operations Planning	The submitted documents must be project specific and as a minimum will include: • HSEQ Management System [*see MOR016 – Developer Safety Management Requirements*] • Detailed Engineering and Method Statement • Risk Assessment • PLAN-002 Wave Hub ERCoP – *MMO/MCA Approved* Construction, Operation and Decommissioning Phases • FORM-M003 Maritime Safety Information – Construction or Decommissioning Works ***WHL must attend the risk assessment workshop and validate these plans prior to issuing permits.*** ***The level of detail of the documentation should be commensurate with the scale of the project.*** **Risk Assessment** The installation of a marine renewable energy device will be subject to the Construction (Design and Maintenance) Regulations 2015 (CDM). A key element of CDM is that the duty holder should manage risks by the application of the principles of prevention. Where possible risk should be eliminated. Where risks cannot be eliminated, they should be reduced to the lowest extent possible, and residual risk should be managed with collective measures being provided before resorting to personal protective equipment. Risk Assessment must be an integral part of the project at all stages from design and planning through to completion. It is expected that the hazard log clearly shows the relationship between the identified hazard, the causal factors and the risk control measures and/or contingency. The risk identification process will be detailed, site and project specific. Persons participating in the Hazard Identification process must be competent and experienced in the area being considered. A Hazard Identification and Risk Assessment (**HIRA**) or a Hazard and Operability Study (**HAZOP**) workshop must be held prior to finalising installation or removal plans and WHL must be invited to attend and input. *All risks should be reduced to 'as low as reasonably practicable' (ALARP).*

Marine Operations Planning	**Method Statements** The Developer must provide a detailed method statement that meets WHL's requirements and industry best practice. This should provide a detailed and coherent account of how the works are to be completed and the resources and methods to be used. A comprehensive method statement is usually acceptable as a construction phase plan under CDM 2015. The method statement should as a minimum include: • Scope of Work • Project Structure • Personnel Competency • Roles & Responsibilities • Communications Plan • Installation Testing and Acceptance Criteria • Change Management Plan • Milestones, Hold Points and Gantt Chart • Engineering Assessments and Drawings • Vessel, Equipment and Contractor Selection • Met-ocean Limits and Positioning • Vessel Trials Plans and Acceptance Criteria • Equipment Lists, Specifications and Certification • Works Methodology Story Board • Task Plans • Contingency Plans and Equipment • Emergency Procedures • Environmental Protection and Controls

Marine Operations Planning	Management of all relevant processes shall be managed in accordance with the Developer's HSEQ Management System or Method Statement. These may include but are not limited to: • HV works and testing • Permit to work management • Personnel transfer and marine coordination • Vessel operations management and navigation • ROV / Diving operations • Lifting operations and manual handling • Device access / handling / transport • Mooring and device installation or removal • Cable and connector works • Plant and equipment inspection • Hot works • Confined spaces • Working at height / over water • Hazardous substances • Environmental conditions: site access, inspection, security, welfare, first aid and PPE • Survey and positioning • Waste and pollution management • Communications infrastructure • Inductions and toolbox talks • Reporting of daily progress • Incident reporting and fault correction

General Installation or Removal Requirements	• Permit requirements:
	  o **Developer Permit to Operate (FORM M014)**
	  (*WHL validation of marine licence, project safety system, technical reviews, build compliance, operational management plans and contingency arrangements*)
	  o **Permit for Special Operations (FORM-M016)** as applicable for **Device Deployment or Decommissioning**
	  (*WHL validation of operation specific safety management arrangements, risk assessment, method statement, maritime safety information and ERCoP construction or decommissioning phase update*)
	  Please note this permit also applies to other activities, and always to Wave Hub Cable and Connector Handling [see Form-M016]. ***The PSO cannot be issued without a valid PTO in place.***
	• **Positioning of infrastructure**: the vessel and position fixing system (DGPS or better) must deliver the installation accuracies required within the working limits defined. Positioning of installed infrastructure to be recorded and verified by a competent surveyor using the specified position fixing system. *Key as-built location data includes but should not be limited to*: *cable route position lists, connector and cable protection positions, anchor and mooring line positions, and neutral Device positions*.
	• All MMO **Marine Licence conditions** must be satisfied. *Where Bathymetry survey is stipulated, this should be to IHO Order 1A accuracy, use the ETRS89 coordinate system and apply the same geodetic parameters used by WHL surveys to allow data overlay or comparison.*
	• **Accurate infrastructure co-ordinate schedules, as-built plans, photos, as-built maritime safety information (Form M003) and completed Wave Hub ERCoP Operational Phase update (Plan-002)** must be supplied to WHL as applicable to the work scope within 1 week of works completion to enable works acceptance and promulgation of safety information and notifications. *Where Wave Hub cables are handled, then additional requirements apply as stipulated in MOR-003.*
	• **Post works assessment reports, safety analysis and post-processed data** shall be shared with WHL within 4 weeks of completion and shall include but not be limited to an **Operations Report, As-Built Survey Report, processed As-Built Survey Data** (**a full ROV visual inspection of the sea-bed installation is required in every case – *MOR-011* requirements apply**, and post-processed MBES data where bathymetry survey is required by the MMO) and **CDM 2015 H&S File**.
	• **Works completion safety review** and operational phase arrangements discussion to be held with WHL within one month of completion of installation works.
	• Attendance at annual **emergency response exercises** to be run each autumn (until such time that all equipment is decommissioned).
	All positions to be quoted to WHL in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes.

Marine Operations Requirement (WAVE HUB-OMS-MOR-002)

Device and Mooring Design

WHL minimum requirements including compliance with the OMS, ASMS, RUK Guidelines, HSWA, MHSWR, CDM and EWR should be incorporated into the device and moorings design.

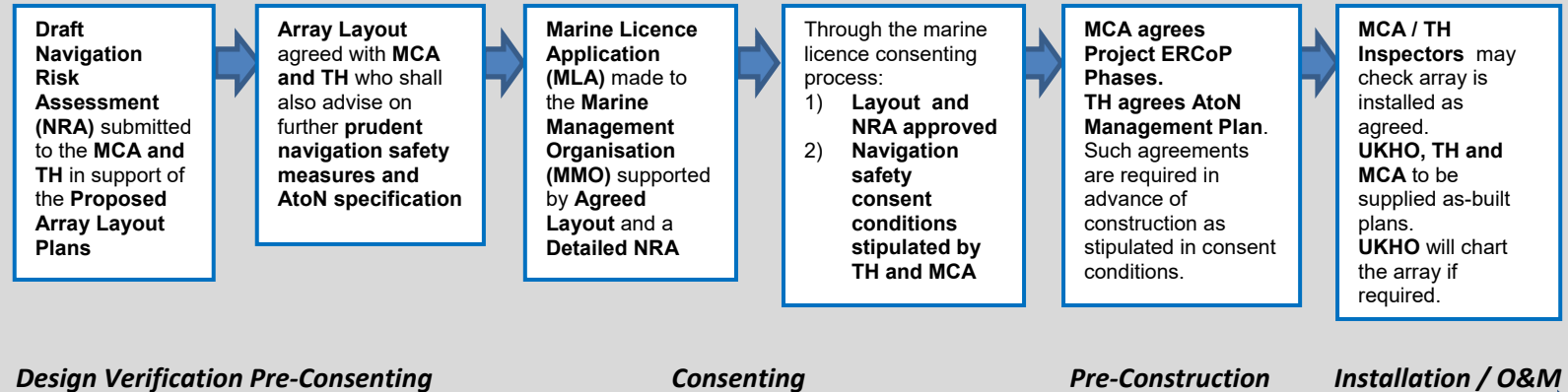
Requirement	Details
Third Party Verification (TPV)	**Third Party Validation, by a suitably qualified, competent and independent third-party engineer, as to the reasonable suitability and survivability of the technology and moorings to be installed.** This shall encompass a review of the **complete system structural design** including but not limited to the following key elements: • **Moorings design** - to current industry best practice (*includes positional moorings and generation tethers*). • **Device structural design** *(including ultimate and fatigue load checks – see input requirements below*) • **Safe access system structural checks** (*e.g. access ladders, gantries, handrails, bollards, fenders, fall arrest systems etc.*) The study should (where appropriate) include checks or assessment of the following factors: • **Load Cases:** o Ultimate Load State (ULS): 1/100 & 1/10 year extreme wave heights at Wave Hub* o Fatigue Load State (FLS): annual wave scatter table for Wave Hub* • **Redundancy or Factors of Safety** where applicable • **Failure Mode and Effects Analysis** (**FMEA**) of the complete system structural design **Construction or servicing recommendations must be given due consideration by the designers.** ***MCA Guidance:*** *Third party verification by an independent competent person / body is considered necessary to ensure quality in design and operation. This should bring in technical expertise and independent oversight.* *The TPV shall be issued to WHL and the MMO.* *The Wave Hub Permit to Operate shall only be issued on acceptance of the TPV by all recipients.* **** Key Metocean References: 2013 HR Wallingford 33 Year Metocean Model / 2017 Fugro Current Velocity and Water Level Analysis***

Moorings Design (*MCA and HSE Regulatory Expectations for Mooring OREIs – June 2017 DRAFT for Consultation*)	Drawn from the oil and gas industry, ***Offshore Information Sheet (OIS) No. 4/ 2013 on Offshore Installation Moorings – Rev 2 Nov 2016*** may be used to draw up design specifications for new mooring systems. While complete compliance is not the intention, the key principles implied are essential considerations as outlined below. **Overall Aim** The duty holder shall ensure that an offshore renewable energy installation (OREI) and its moorings always possesses such integrity, through its lifecycle, as is reasonably practicable to ensure the health and safety of persons at work and/or those affected by the operation of the device. The design of the OREI and its mooring should ensure that: • it can withstand such forces acting on it as are reasonably foreseeable; • construction, commissioning, operation, modification, maintenance and repair of the installation may proceed without prejudicing its integrity; • it may be decommissioned and dismantled safely; and • in the event of reasonably foreseeable damage to the installation it will retain sufficient integrity to enable action to be taken to safeguard the health and safety of persons on or near it. Reasonable considerations include: • Environmental conditions, e.g. winds, waves, water depth and tidal conditions; • Moving the OREI including tow out to site; • The weight of the installation and anything on it, buoyancy, drag and inertia forces from movement of the OREI; and • Unplanned incidents including vessel impact. **Safety Management System** The safety management system for the design, installation, operation, maintenance and decommissioning of an OREI mooring system should as a minimum demonstrate compliance with the relevant parts of the following legislation: • Health and Safety at Work Etc Act 1974 • Management of Health and Safety at Work Regulations (MHSWR) 1999 • Provision and Use of Work Equipment Regulations (PUWER) 1998 • Supply of Machinery (Safety) Regulations – ESHR 2008 (Amended 2011) **Design** The duty holder should demonstrate that they have used the most relevant standards, proportional to the reasonably foreseeable risks anticipated, to ensure a suitable mooring system is specified, manufactured and installed. Suitable records of the key decisions made should be kept.

Moorings Design (*MCA and HSE Regulatory Expectations for Mooring OREIs – June 2017 DRAFT for Consultation*)	**Hardware** Chains, wires and other mooring components must be of an appropriate standard, quality and certified by an independent competent body such as a class society, or similar, for its material composition. **Installation** The installation of a mooring system as part of an OREI development will be subject to the Construction (Design and Maintenance) Regulations 2015 (CDM). A key element of CDM is that the duty holder should manage risks by the application of the principles of prevention. Where possible risks should be eliminated. Where risks cannot be eliminated, they should be reduced to the lowest extent possible, and residual risk should be managed with collective measures being provided before resorting to personal protective equipment. The designer of the mooring system must consider these principles and any pre-construction information provided to eliminate, so far as is reasonably practicable, foreseeable risks to the health or safety of any person: • carrying out or liable to be affected by construction work; • maintaining the mooring system or OREI; or • using the OREI as a workplace. For example, the designer should consider installation techniques which remove diving operations. The designer should provide sufficient information to enable the installation contractor to plan and execute the installation of the mooring system without risks to health and safety. Suitable and sufficient risk assessments should be carried out by a competent person to determine a safe system of work for installation. Suitable tests should be carried out to ensure that it has been correctly installed for safe operation. **Operation** Integrity management is a vital part of long term operations. The design risk assessment, or similar, for the mooring system should be completed prior to installation, to determine an appropriate maintenance and contingency plan. Considerations should include the frequency and location of inspections, any other control measures required to maintain the mooring system in a safe condition, and actions to be taken in the event of mooring system impairment. **Monitoring** There must be a provision for continuous monitoring of the mooring system to alert the Developer duty manager in case of a line failure. This could be by way of position monitoring using GPS or other suitable means of monitoring mooring integrity.

Navigation Risk Management

A prudent project development route, from a navigation risk management perspective is provided here as guidance based on feedback from the **Maritime and Coastguard Agency (MCA)** and **Trinity House (TH)** who work together closely as the primary authorities with responsibility for navigational safety:



Detailed array safety assessment and planning should be undertaken in the early stages of all projects. Due to the large variations between projects and technologies, early consultation and meetings with both Trinity House and the MCA (together if possible) will inform determination of project specific requirements. The MMO Marine Licence conditions enforce the agreed MCA and TH requirements. In all instances, the latest MMO guidance should be followed: https://www.gov.uk/make-a-marine-licence-application when working towards making a Marine Licence Application.

A few of the requirements above are detailed further below:

1) The **Navigation Risk Assessment (NRA)** should be site and technology specific and accommodate the requirements of the **Wave Hub Active Safety Management System (ASMS)** and any specific requirements of either TH or the MCA in relation to the technology or array. The NRA must be honest and thorough, addressing all foreseeable navigation risks posed to or by the proposed infrastructure and supporting offshore operations.

   A draft NRA should ideally be provided in support of early MCA and TH consultation on array layout and marking. By way of an introduction to the NRA, the Developer should provide a project and technology overview sufficient to inform the MCA and TH layout and navigation safety appraisal.

Navigation Risk Management (*Continued*)	2) **Detailed Array Layout Approval**. Array layout optimisation shall fully consider all engineering design factors as well as MCA and TH guidance and project specific requirements defined through consultation. MCA guidance provides some advice concerning array design. To assist Search And Rescue (SAR) operations and safety of surface navigation, an array layout shall seek to achieve symmetry and uniformity or, as a minimum, orientation consistency. The objective is to provide SAR vessels and particularly RNLI lifeboats safe passage through the array consistently in at least one direction (but ideally two). The widths and separation of these constant bearing parallel transit corridors throughout an array should be agreed with the MCA and TH on a case by case basis and where possible should align with the prevailing wind direction. The array layout drawing presented for consultation or included in the Marine Licence Application should show all infrastructure (above surface, surface, below surface and seabed), safe corridors and all associated target coordinates. For the purposes of informal consultation, TH uses MapInfo GIS software and prefers layout drawings to be supplied as Shape Files (.shp). Construction micro-siting limits should be specified and agreed with the MCA and TH as part of the layout approval process. Final as-built plans and co-ordinates including device identification (WGS84 *latitude /longitude, in degrees, minutes & 3 decimal places of minutes*) shall be provided to WHL, MMO and UKHO as specified in ***MOR001*** and the marine licence. *The MCA and TH recognise that Devices vary considerably in their engineering requirements and risk profiles and as such, each Developer must consult with the MCA and TH early. Where possible, consultation should be before making a Marine Licence Application or even before any relevant detailed design or preliminary geotechnical investigations are commissioned to avoid abortive work.* 3) **The Device Identification and Aid to Navigation (AtoN) Specifications** will be advised by the MCA and TH respectively through consultation and enforced through marine licence conditions. The marking strategy, if proposed by a developer, should adhere to all relevant marine best practice guidance and statutory regulations. Please note that Device Identification is an MCA function (**MGN543 *or subsequent update***) and as indicated in the Wave Hub ASMS, identification for all structures near or above the surface shall be considered. 4) The **Project ERCoP Phases** shall be approved (MCA and MMO) by an MCA SAR Operations Subject Matter Specialist prior to commencement of construction. These phases are **Construction**, **Operation** and **Decommissioning** and the appropriate phase will be included in the relevant section of the **Wave Hub ERCoP.** Upon change of project phase, the project section in the ERCoP is updated with the approved plans and the ERCoP re-submitted by WHL to the MCA CGOC.

Navigation Risk Management (*Continued*)	5) TH have advised on the typical contents expected in an **Aid to Navigation (AtoN) Management Plan** (*project specific requirements may be stipulated during consultation or in a marine licence*) which should be drawn up by a Developer after the Marine Licence is issued for approval by TH prior to construction: • AtoN Contacts – Developer Marine Operations Manager and Duty Manager contact details • Charts and plans of lighting and AtoNs as per the requirements advised by TH • Detailed specification of the AtoNs to be established (including the required levels of availability) from the commencement of the authorised scheme to the completion of decommissioning • AtoN maintenance, monitoring and testing regimes. • Procedures for investigation and rectification of reported AtoN failures. • Emergency procedures for confirmed AtoN light failure - including provision of temporary marking buoys or guard vessels and availability of agreed measures. • Emergency procedures relating to a Device or AtoN going off station. • Notice to Mariners (*through WHL*) and other methods of safety information promulgation. • Decommissioning plan for AtoNs (even if this is a simple decommissioning statement such as "*consult Trinity House 6 months prior to decommissioning works commencing*") • Procedures for monitoring and reporting the availability of AtoNs (generally the TH PANAR System is used for this purpose and Developers will likely be setup with appropriate access: https://panar.thls.org/atonreporting/). **Key Navigation Safety Consultation Contacts:** MCA Navigation Safety, Offshore Renewables Advisor (*NRA, Layout, ID Marking*): Nick Salter - nick.salter@mcga.gov.uk MCA SAR Operations, Offshore Energy Officer (*NRA, Layout, ID Marking, ERCoP Phases*): Pete Lowson – peter.lowson@mcga.gov.uk TH, Navigation Services Officer (*NRA, Layout, AtoN Specification and Management*): Steve Vanstone - stephen.vanstone@thls.org ***Useful References:*** *The Wave Hub ASMS, ERCoP, NRA and shipping surveys provide further context for this work.* ***MCA Design*** *and* ***NRA*** *Guidance: offshore-renewable-energy-installations-impact-on-shipping* ***MCA*** *Guidance:* ***MGN543*** *- Offshore Renewable Energy Installations - Guidance on UK Navigational Practice, Safety and Emergency Response* ***MCA*** *Guidance:* ***MGN372*** *– Offshore Renewable Energy Installations – Guidance to Mariners* ***IALA*** *Recommendation:* ***O-139*** *The Marking of Man-Made Offshore Structures*

Marine Operations Requirement (WAVE HUB-OMS-MOR-003)

Wave Hub Cable and Connector Handling

Procedures for any operations handling Wave Hub subsea cables or connectors shall comply with the following minimum requirements and shall always be in accordance with the latest cable and/or connector manufacturer's requirements and recommendations.

Principle Shared Resources and References:

- ***Developers\General Developer Info\Cable and Connectors\Cable Tail Information***
- ***Developers\General Developer Info\Cable and Connectors\ETA DMCs***
- ***Contractors\Cable Contractor Information\Cable and Connector Data***

WHL will provide general guidelines and operational recommendations for Developers handling the Wave Hub DMC in support of these requirements.

Requirement	Detail
Design, planning, engineering and monitoring shall ensure that the cable manufacturer's mechanical performance parameters are not compromised under any operational condition during handling.	To include but not limited to repositioning and replacement of cable protection, product lifting, recovery to deck, connecting, disconnecting, repair, over boarding, and re-laying operations.
Design, planning and engineering shall ensure that the manufacturer's requirements and recommendations are observed and adhered to throughout any operations impacting the Wave Hub cables and connectors.	Cable tension management on over-boarding chute and seabed touch down monitoring: • The Operator must provide a remotely operated vehicle (ROV) spread, capable of providing touch down/lift off monitoring during cable handling as well as any other actions required in contingency plans and approved method statements. As a minimum, the ROV must be capable of handling and connecting ropes and wires, especially those used for recovery of connectors and dropped objects. • The catenary departure angle and tension must be constantly monitored at the chute using equipment and software appropriate to the cable handling spread.
Design, planning and engineering shall ensure that cable routing is consistent with consents, cable handling requirements, WHL spacing and positioning requirements and has taken due regard for any protection measures that may be necessary.	Wave Hub Cable Handling (General Approach): 1) Pre-works video survey for anomalies prior to cable handling 2) Electrical isolation, permitting and test requirements to be agreed (EOR-001) 3) Cable protection and stabilisation measures and any fishing gear to be cleared 4) Cable ends to be lifted and lowered by winch wire passing over chute with crane assistance only whilst over-boarding 5) Radius of over-boarding chute/quadrant appropriate to cable design parameters 6) Continuous cable tension management on over-boarding chute as well as continuous catenary and seabed touch down monitoring during cable handling (monitored and recorded data must include as a minimum: date, time, touchdown KP, touchdown coordinates, chute tension, cable bottom tension, cable touchdown depth, cable departure angle, catenary length, lay speed)

	7) Cable re-lay should seek to minimise risks to the cable (spans and obstructions) and must be within consented areas and as close to original RPL as possible 8) Restoration of cable protection and stabilisation measures to specification (below) 9) Completion of all agreed electrical testing and acceptance tests 10) As-built video survey (*and bathymetry survey where Marine Licence requires*) 11) Production of as-built accurate RPL within 24hours of completion (*safety notices*) Wave Hub Cable Tail Proximity and Stabilisation Specifications: 1) Minimum 15m between cable tail extensions (*WROV cable and protection safe working clearance*) and no closer than 5m to Wave Hub site boundary 2) Minimum proximity of Operator non-electrical seabed infrastructure to Wave Hub cable: 120m (*allowing parallel cable working only*) 3) Stabilisation and protection of cable tails and accessories: a. 4T rock bag cable stabilisation at not more than 60m intervals on cables b. Additional 4T rock bag placed on accessories c. Additional 4T rock bags at the start and end of cable abrasion protection d. Removal of all residual free spans with 2T rock bag pairs.
Design, planning, engineering assessment and the resulting detailed operations documentation shall demonstrate that vessels, equipment, plant, machinery and personnel are suitable and appropriate to ensure cable and connector integrity is not compromised.	Adequate power, lighting and communication systems shall form part of these minimum requirements, including a redundancy provision to all systems. Operator shall provide a detailed FMEA on all DP systems. Operator shall provide a detailed works Schedule. Operator shall provide detailed plans for management of health and safety and for protection of the environment. Operator shall always provide a detailed methodology, risk assessment and emergency response plan in accordance with *MOR-001* or *MOR-013* as applicable. The complete list of documents the Operator plans to submit for the operation inclusive of post completion reporting shall be defined by the Operator in a Master Document Register (MDR) and submitted to WHL for acceptance. Developer Cable Design and Connecting to the Wave Hub DMC: • Developer cables and accessories connected to the Wave Hub DMC must adequately protect the Wave Hub system from water ingress. • ETA Connect Limited shall be used for fitting or removing the half DMC to/from the Developer's cable and for connecting/disconnecting the complete DMC offshore. Prior to mobilisation the Developer half-DMC and cable shall be tested by ETA and witnessed by WHL.

- Developer to accommodate WHL maintenance, upgrades, tests and inspection of the Wave Hub half DMC whilst it is on deck prior to making connection.
- The DMC must be seal tested in accordance with the manufacturer's instructions prior to any immersion. The WHL representative must witness this test and a seal test certificate issued prior to over boarding.
- After installation of the DMC, details of the rigging left attached to the DMC must be supplied to WHL supported by the appropriate drawings, specifications, original certification and a photo of the equipment as laid.
- Where the DMC is to be connected to a pre-installed Developer cable (the final operational connection) and lowered at the crown of a cable bite then the bend stiffeners must be upgraded to bend restrictors or alternative cable controls implemented that prevent the overbending of the cables emerging from the DMC during over-boarding, deployment and recovery operations.
- Where the DMC is to be connected to a Developer cable yet to be laid (the first operational connection) and is lowered as part of a catenary it must be supported through the Developer's cable and not via a secondary winch wire. In this instance, the Developer's cable to be laid must be pre-prepared and terminated in such a manner that system isolation time is minimised.
- Based on the CIGRE TB 623 guidelines, the minimum Developer Umbilical Safe Working Load for deployment and recovery is 24kN. Where required (marginal cases and for dynamic cables), verification that the Developer cable and connection between the cable and DMC is sufficiently strong should consist of:
    - Tensile Bend Test: 24.0kN
    - Tensile Test: 24.0kN for 30 minutes
- A robust engineering assessment of the loads applied to the Wave Hub cable tail and DMC during cable tail recovery or deployment shall be provided.
- The cable and connector system design, route and stabilisation must ensure that there is no interaction between the Developer's dynamic cable system and the Wave Hub DMC. WHL will validate the stability assessment and dynamic modelling undertaken to ensure this requirement is met. Where the Wave Hub DMC and cable tail is at risk of transmitted forces then the Developer should install a weak-link in the system to ensure the DMC is not at any risk of movement.
- The Wave Hub DMC should not be viewed as a dynamic point of connection and operational interaction with this component should be minimised.
- The Developer's connection cable shall be of wet design according to CIGRE technical brochure 490.
- The Developer shall consider slack in their cable system to enable effective repairs around the point of connection to the Wave Hub infrastructure.

	• The Developer dynamic cable connecting to the Wave Generator is going to be suspended in the water column. There are three mechanical dynamic cable design requirements to ensure this cable is fit for purpose: o Deployment/Recovery. The recommendation is that the tensile and bending requirements are in line with CIGRE TB 623. As a minimum, a desktop exercise should be carried out to explore the dynamic fatigue performance of the cable. o Dynamic performance under normal operating circumstances (installed and on load). An Orcaflex analysis followed by fatigue analysis as per CIGRE TB 623 should be carried out. If fatigue verification data exists for the cable from a fatigue rig, this should be taken into consideration and used to verify the modelling. The annual wave scatter table for Wave Hub should be used as an input to this analysis. o Dynamic performance under extreme circumstances (extreme 1/100 & 1/10 year met-ocean conditions at Wave Hub). Orcaflex analysis using extreme met-ocean conditions will yield the peak axial, tensile and bending values to verify the cable can still work within specification. WHL will provide the following metocean reports and data to support this work: *2013 HR Wallingford 33 Year Metocean Model / 2017 Fugro Current Velocity and Water Level Analysis*.
Qualification of new equipment, systems, processes and/ or procedures as required by WHL prior to handling Wave Hub cable or connectors. Qualification of existing equipment, systems, process and/or procedures in a new environment or application as required by WHL prior to handling Wave Hub cable or connectors.	Inspection, test and trials plans together with pass/fail criteria to be established and witnessed by the WHL representative.
Positioning and manoeuvring systems for vessels shall be installed and operated to provide redundancy of all critical systems when handling Wave Hub cable. Where redundancy is not 100% then adequate contingency plans must be developed and agreed for all cable operations that could affect the Wave Hub cable. Plans for the proposed marine spread and operations shall be appropriately assessed and the detail commensurate with the scope of work.	Minimum dynamically positioned vessel requirements are as follows: - DP1 Classification for Wave Hub DMC connection and disconnection operations - DP2 Classification for Wave Hub cable repair or jointing - Compliance with Wave Hub *MOR-006 Dynamic Positioning Vessels* - Compliance with Wave Hub *MOR-004 General Purpose Vessels and Manning* Any anchored barge shall have a minimum of a 6-point mooring together with a full dynamic mooring analysis relating to conditions that may be reasonably anticipated during the operational period. Compliance with *MOR005 Moored Vessels or Platforms* is required. The Contracted Construction Vessel shall have adequate deck space and strength (*supported by sea-fastening calculations*) for the specified spread and operations.

Operational weather limits, environmental criteria and hold points shall be clearly defined.	All operations must be conducted safely and the vessels selected appropriate to the technical requirements of the scope of work. WHL will always review and validate the method statement and risk assessment. The Operator must work to appropriate and safe operational limits throughout the offshore operation. These must be based on thorough analysis of met ocean data and predicted task durations (offshore transit, work and test phases, survey). The Operator is required to provide all manpower for the operation: cable testing and electrical safety, equipment operation, jointing, vessel management, logistical management, marine crew and replacement contingency. All personnel must be competent and experienced in the work to be undertaken and CVs of key staff will be validated by WHL.
Cable handling systems shall be capable of controlled deployment and recovery under all conditions that may be anticipated during the planned operations. Wave Hub cables shall not be coiled. Cable storage and drive systems shall be appropriate for marine use. Cable control systems shall display all required information at control stations. Control information shall be recorded.	Cable handling systems shall be fit for purpose and subject to a demonstrable regime of planned maintenance. Cable reel under-roller drive systems shall not be used offshore.
An independent, industry standard project and location specific weather forecast shall be monitored on at least a 12-hour basis for operational planning purposes.	To include significant wave height, wind speed and tide predictions. To include lightening risk element. To be included and circulated with DPRs. Reasonable working limits (wind, wave and tide as a minimum) must be agreed. Handling of Wave Hub cables shall only commence on a stable or improving forecast.
Design, planning and engineering shall include a full failure mode and consequence analysis.	Contingent operations shall be detailed and all relevant contingency equipment mobilised. All reasonable endeavours must be taken to return the Wave Hub system to service promptly on confirmation of a fault within the Developer cable system (i.e. in the zone external to the Device or array circuit breaker back to and including the Wave Hub DMC). Contingency arrangements shall be validated by WHL in advance of commencement. A live abandonment cap including for loop back of fibres should always be mobilised in support of cable operations.
Temporary or permanent end seals or connector caps shall be applied to cable ends in accordance with manufacturer's requirements and recommendations to ensure watertight integrity prior to any immersion.	Suitable end seals and detailed contingency plans shall be available for the earliest application in the event of any cable abandonment.

Cable Operations Deliverables Summary:	1) HSEQ management plans, detailed operational method statement and risk assessment, HIRA, met-ocean analysis and clearly defined working limits 2) Detailed contingency and emergency response plans (including Wave Hub ERCoP update) and details of equipment to be mobilised in support 3) Detailed engineering including cable and connector system specifications, cable route plans, dynamic modelling, cable stability and free span assessment and protection design 4) Engineering drawings, deck plans (and associated sea-fastening assessment) and operations charts 5) Detailed vessel, crane, winch, ROV, cable handling equipment spread, cable monitoring and survey systems and personnel information 6) Vessel and equipment to be made available for inspection including provision of safe access and egress prior to mobilisation and trials commencing 7) Transfer to and from the construction vessel, on board accommodation, welfare, communication facilities and live access to all cable monitoring information must be provided for a WHL representative during Wave Hub cable handling operations at no cost to WHL 8) The Operator must contemporaneously provide detailed DPRs as a minimum meeting all the requirements of *Form-M006*. 9) The Operator must reinstall all cable stabilising rock bags removed from Wave Hub cables to specification and remove all free spans with 2T rock bags 10) Detailed as-built cable route position list (RPL including all cable, rock bag and connector positions), survey log, anomaly and free-span log, recorded and formatted cable laydown data, detailed as-built plans, maritime safety information (*Form M003*) and Wave Hub ERCoP update (*Plan-002*) must be supplied to WHL within 1 week of works completion to enable works acceptance and promulgation of safety information and notifications. 11) All MMO *Marine Licence Conditions* must be satisfied. Where Bathymetry survey is stipulated to prove 5% water depth is not exceeded, this should be to IHO Order 1A accuracy, use the ETRS89 coordinate system and apply the same geodetic parameters used by WHL surveys to allow data overlay and comparison. 12) Final operations report, as-built survey report and processed as-built survey data (full ROV visual inspection of the completed installation and all handled cable in every case – *MOR-011* requirements apply, and post-processed MBES data where bathymetry survey is required by the MMO) must be supplied to WHL within four weeks of works completion. ***All positions to be quoted to WHL in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes.***

Marine Operations Requirement (WAVE HUB-OMS-MOR-004)

General Purpose Vessels and Manning

Minimum Standards for permitted vessels operating on the Wave Hub offshore site

Requirement	Detail
Vessel Minimum Navigation Safety Equipment Requirements	• **VHF - DSC** • **GPS** *(minimum of DGPS is required for any accurate position fixing or works proximate to infrastructure)* • **Radar** • **Echo Sounder** • **AIS Transponder**
Vessel Communication Requirements	• Clear name on vessel's hull • AIS on and status kept up to date • VHF Call Sign and MMSI (*VHF dual-watch of channel 16 and the designated operational channel on high power*) • A second, independent means of ship to shore communications (*Mobile coverage is patchy onshore and offshore and should be checked, Orange has been most effective to date offshore*) • 24Hr ashore and offshore duty contacts and contact details (*these duty contacts must be available at all times*) • ***Offshore Access Planned and Notified through OPANS (see MOR-009)***
Vessel Compliance *In all cases, vessels must be compliant with the relevant regulations under the UK Merchant Shipping Act 1995.*	• Classification Rules (*where applicable*) • Flag State Certification (*MCA or IMO Certification, and if applicable, a Paris MoU Inspection Report).* • Audits: o IMCA M149 CMID where vessel certification and compliance is not adequate or where any safety concerns exist (*to be arranged by the Operator at WHL request utilising a competent third party*) o Fitness for purpose inspection of vessel and specialist equipment where handling or working on Wave Hub electrical infrastructure (*WHL will arrange and Operator shall facilitate safe access*)
Vessel Selection: Best Practice Guidelines	Vessel selection and operation should be in accordance with the current version of the *Vessel Safety Guide – Guide for Offshore Renewable Energy Developers* published by *Renewables UK.* ***In all cases vessel selection must be carefully considered and risk assessed, and the vessel capability, standards and crew competency fit for purpose in respect of the task, environmental and site-specific conditions. Although cost is a major consideration, selection must <u>not</u> be driven by cost and availability alone.***

Vessel Insurance	• In accordance with legislation and the schedule contained in the relevant WHL Contract or Berthing Agreement • Minimum Protection and Indemnity cover: £5m (*to protect the WHL asset*) • WHL to be named/assured on the third-party insurance for primary works or maintenance vessels (*Reduced cover may be accepted for small works and survey vessels at WHL's discretion*)
Vessel Manning Compliance (*STCW standards*)	• Vessel Master: o Appropriate commercial competency certification in every case (*MCA or MCA accepted equivalent)* • Vessel Crew, as applicable to the vessel type: o Safety Management Certificate (ships) *or* an appropriate vessel operator Signed Crewing Policy (workboats) o Crewing shall always meet assessed vessel minimum safe manning requirements o Specified passenger limits must never be exceeded o Specialist Equipment Operator (competency) certification (*where applicable*) o Sufficient English Language competency amongst bridge personnel to ensure 24 hour cover. • Third Party Personnel working offshore: o STCW Personal Survival Techniques (*or recognised equivalent*) o Seafarer Medical: ENG 1 or ML 5 (*or recognised equivalent*) o Vessel Induction *(from vessel master or delegated representative)* ***Unqualified visitor access shall be appropriately limited, controlled and supervised by the responsible party.*** *It should be noted that vessel specific boarding requirements may vary and must also be observed.*
WHL Vessel Compliance Documentation Checks	• Vessel details up to date on OPANS (*a system requirement prior to selecting a vessel for an operation*) • Vessel and key equipment specifications and certification • Vessel class and safety documentation (*as specified on back page*) • Vessel master certificate of competency • Vessel owner/operator signed crewing policy (*applies to workboats with no SMC*) • Specialist personnel competency certification (*where reasonably requested*) • Vessel insurance certificates ***Under a long running Permit to Operate, all relevant documentation must be refreshed in full annually.***

Towing Operations	• Towing operations shall always be under the charge of an appropriately qualified and competent towing master. • Towing of a Device or offshore infrastructure shall be thoroughly planned and risk assessed according to best practice. The vessel, crewing, towing equipment and towed object characteristics shall be assessed as fit for purpose by competent persons and appropriate navigation and weather limitations applied along with preparation of robust contingency plans. Tow plans including the proposed equipment arrangement shall always be approved by the vessel master. • A thorough **tow test** in sheltered waters and a favourable forecast are always required before commencing the transit to site. • Adequate vessel (endorsed for towing) and towed object **insurances (including third party liability)** must be in place to cover any potential damage that could result. • In exceptional cases, where circumstances or factors signify an increased risk to the tow, or where the risk cannot be evaluated on the basis of seafaring and nautical knowledge and experience alone, the operator should apply for survey by a competent organisation or authority, as appropriate. • The principles of the ISM Code shall be applied to all vessel operations irrespective of size, power or class, this includes towed barges. ***References:*** *MCA MGN 468 / MCA MGN 308 / IMO MSC 884 / Noble Denton: Guidelines for Marine Transportations*
Vessel Lifts and Cargo Handling	• Vessel lifting and load-out operations shall always be under the overall charge of an appropriately qualified and competent master with support from a competent crane operator and lift supervisor. For routine ship lifting operations *MCA MGN332* shall apply through certified ship safety procedures. For all lifts in connection with a Device or offshore infrastructure *HSE L113 LOLER 1998* applies. • All Device and related infrastructure lift operations (alongside or offshore) should be thoroughly planned and risk assessed according to best practise by a competent **appointed person.** The **lift plan** should specify use of suitable and well-maintained equipment and the lift involve only operatives suitably trained and competent to perform the lift under appropriate supervision. *WHL may check offshore lift plans and arrangements.* • A favourable forecast and a small (<1m) **test lift** should be carried out prior to lifting any load to its final resting place. • Before commencing equipment load out onto a ship, the vessel (*stability and load-line*), sea-fastening and deck layout shall be assessed by competent persons. Engineering plans and calculations shall always be approved by the vessel master. *WHL will also check the spread where handling the Wave Hub asset*. ***References:*** *Renewable UK: Offshore Wind and Marine Energy Health and Safety Guidelines 2014, HSE ACOP L113 LOLER 1998, MCA MGN332, IMCA M187, IMO Load Line Convention 1966*

WHL Vessel Safety Documentation Checks:

Ships [> 24m loadline length]:

Minimum Safety Certification:

- **Certificate of Classification** (all ships)
- International Safety Management Code - **Safety Management Certificate** (all ships)
- **Minimum Safe Manning Document Certificate** (ships > 500gt)
- Vessel Operator **Document of Compliance** (*if applicable)*

Survey: Where handling Wave Hub electrical infrastructure or as required by WHL. ***If an IMCA M149 CMID is available and less than 12 months old please provide in the first instance for review*** *(an in date and acceptable CMID with notified non-conformances corrected, may at WHL's discretion fulfil the safety documentation requirements).*

Workboats [< 24m loadline length]:

Minimum Safety Certification:

- **Small Commercial Vessel (SCV) Certificate**
- SCV2 Inspection Logbook
- **Classification Certificate** (*if applicable – specialised vessels*)

Survey: Where handling Wave Hub electrical infrastructure or as required by WHL. ***If an IMCA M149 CMID is available and less than 12 months old please provide to WHL.***

Fishing Vessels (*to be used only where deemed appropriate*):

Minimum Safety Certification:

- **Fishing Vessel Certificate**
- **Certificate of Registry**
- Oil Pollution Prevention Certificate

Marine Operations Requirement (WAVE HUB-OMS-MOR-005)

Moored Vessels or Platforms

Where vessels or platforms will be moored on the Wave Hub offshore site or for works on the Wave Hub electrical infrastructure

Task	Requirements
Moored vessel and operating platforms	• **Operator position mooring system design and specification (to industry best practice)** for WHL validation including: o The mooring design and the operational environmental limits to be applied (*from a detailed assessment of mooring loads and environmental / site conditions*). In all cases, anchor size, weight and type must be suited to the seabed conditions and holding requirements and the remainder of the catenary appropriate to the potential operating loads. o Vessel position, position tolerance and orientation (with careful consideration to the works proposed). The moored vessel heading should be considerate of the prevailing environmental forces. o Assigned anchor positions (s*ee details below*). o The vessel and anchor position fixing system (DGPS or better) must achieve an accuracy of 1-2m or better to ensure anchor drops are within 10m of assigned positions in every case. ***The vessel and mooring spread specified shall be established from risk assessment and will depend on the operation / task requirements and sensitivity, proximity limits, vessel and equipment capability and condition and crew competency. The vessel and equipment must be fit for purpose, the crew experienced and operations planned to reduce all risks to ALARP.*** • **Anchor proximity to third party or Wave Hub subsea cables***: o Any anchor pulling towards a subsea cable shall be placed at least 250m distant o Any anchor pulling parallel to a subsea cable shall be placed at least 150m distant o Any anchor pulling away from a subsea cable shall be placed at least 100m distant o Any anchor line passing over a subsea cable shall have a vertical clearance never less than 10m *These maybe adjusted on a case by case basis but reduced only if it proved that no contact is possible.* Additional factors that should be considered when considering anchor layout with respect to subsea cables are: o Detailed subsea cable location and protection information o Installation of additional subsea cable protection or mooring line mid-water buoys if necessary o Adoption of the principals of: ▪ avoiding laying anchors across subsea cables (i.e. utilisation of the safe side) ▪ placing anchors crossing a cable as far from that cable as is reasonably practicable *Continued over…*

Moored vessel and operating platforms *(Continued)*	• Where working with Wave Hub subsea cables, the vessel and cable handling equipment to be used may be subject to a **fitness for purpose inspection** by WHL or a nominated representative (*MOR-004 and MOR-003 refer*). The operator must assist in facilitating this audit in good time. WHL or a nominated representative is also to be allocated a berth on board to **observe** the works. In all cases, the operator must provide a safe means of access and egress. • When handling Wave Hub cables, any anchored vessel shall have a minimum of a 6-point mooring system together with a full dynamic mooring analysis relating to conditions that may be reasonably anticipated during the operational period. • **Anchor proximity to third party infrastructure:** safety clearance base cases are as defined in ***MOR008 section 2*** where anchors are to be positioned on the safe side. *Lines must not pass through aid to navigation swinging circles and where lines cross any subsea mooring line or cable the minimum clearance should be at least 250m horizontally and 10m vertically as stated above*. *Anchor positioning shall be agreed in each case through risk assessment with the operator, vessel master, WHL and owners of proximate infrastructure and through application of the principal of keeping anchors and anchor lines as far from infrastructure as is reasonably practicable and wherever possible on the safe side pulling away from infrastructure.* • **Operator detailed contingency plans** covering vessel actions in the event of a mooring failure (e.g. anchor drag, cable failure, winch render etc.) should be provided for WHL validation, particularly including quick and safe recovery methods and methods of maintaining safe distances from any infrastructure put at risk. Contingency plans must be based on a thorough assessment of failure modes and particularly must include effects of and controls in respect of anchor drag. • **Operator installation checks** (against specification) and **operational monitoring** requirements: o Mooring winches (where used) to be fit for purpose (capacity and performance), in good condition and fitted with load monitors and regularly inspected by a competent operator. o Correct application of well-maintained components in the mooring catenaries according to the specification. o Positioning of anchors to be logged and verified by a competent operator using the specified position fixing system. o Vessel position and orientation to be continuously monitored with DGPS used by a competent operator. o Environmental conditions must be monitored continuously by the vessel master and works manager. o Anchors to be grounded (secured on deck) whilst vessel is crossing cables and seabed assets ***In the event of any of the planned limits or specifications being exceeded, WHL must be informed immediately and prompt, appropriate contingency or corrective action taken by the Operator to prevent any asset damage.*** • **Standard vessel and manning requirements apply** (*MOR-004*). • The Operator must contemporaneously provide detailed **Daily Progress Reports (DPRs)** as a minimum meeting all the requirements of *Form-M006*. ** The recommended base case from The Crown Estate 2012 'Submarine Cables and Offshore Energy Installations – Proximity Study'.*

Marine Operations Requirement (WAVE HUB-OMS-MOR-006)

Dynamic Positioning Vessels

Where permitted vessels will be using Dynamic Positioning (DP) on or within the Wave Hub offshore site.

Task	Requirements
Handling Wave Hub Subsea Cables.	• **Only vessels classified and operated to DP2 or higher will be permitted to repair or install Wave Hub cables and accessories (with associated long duration standing times on station).** • **Only vessels classified and operated to DP1 or higher will be permitted to lift and connect to / disconnect from a Wave Hub DMC (provided that the Developer half DMC is ready for mating or wet storage top hat ready for installation).** • **Class Certification** to be supplied to WHL for vessels classified as DP Class 1, 2 or 3 as defined by the IMO code and classified by LR, DNV, GL, BV, NK or ABS. • Vessel master must be Master Mariner MCA Certificated – Unlimited (STCW II/2) with Valid Unlimited DP Certificate. • Two navigation officers who are competent to operate the DP control system of the vessel unsupervised. • DP trials and all scheduled arrivals checks to be performed prior to entering the Wave Hub offshore site and commencing works (vessel propulsion and steering systems including back-ups must be tested and fully operational). • **Position fixing** should be verified by a competent operator using dual frequency high precision DGPS with the appropriate offsets programmed and checked. • The DP Vessel **Run-Off History, FMEA and Capability Plot** shall be supplied to WHL in advance. • The vessel and cable handling equipment will be subject to a **fit for purpose inspection** by a nominated WHL representative (*MOR-004 and MOR-003 refer*). The operator must assist in facilitating this audit in good time, including provision of safe access/egress arrangements. • The nominated WHL representative is to be allocated a berth on board to **observe** the works whenever working with the Wave Hub electrical infrastructure (alongside load-out as well as offshore), including provision of safe access/egress arrangements. • Standard **vessel and manning requirements apply** (*MOR-004*). • **Lightning risk while handling cables**: operational limits must be set (*MOR-003*) and conditions monitored. • The Operator must contemporaneously provide detailed **Daily Progress Reports (DPRs)** as a minimum meeting all the requirements of *Form-M006*.

Minimum Requirements for vessels operating in DP mode on the Wave Hub offshore site.	• The **DP Class** and vessel type specified shall be established from risk assessment and will depend on the operation/task requirements and sensitivity, proximity limits, vessel and equipment capability and condition, and crew competency. The selection must be fit for purpose and seek to reduce operational risks to ALARP. • Where classified, the **Class Certification** should be supplied to WHL as defined by the IMO code and classified by LR, DNV, GL, BV, NK or ABS. • **Vessel master must have appropriate Master Mariner MCA Certification along with an appropriate DP Certificate** • **Position fixing** should be verified by a competent operator using dual frequency high precision DGPS with the appropriate offsets programmed and checked. • The DP Vessel **Run-Off History, FMEA and Capability Plot** should be obtained by the contracting company and used to inform the operational planning (*WHL may request these in support of RAMS*). • Standard **vessel and manning requirements apply** (*MOR-004*).

Reference: IMCA M 103 – Guidelines for the Design and Operation of DP Vessels (2007)

Marine Operations Requirement (WAVE HUB-OMS-MOR-007)

Device Support Operations

WHL minimum requirements including compliance with the OMS, ASMS, RUK Guidelines, HSWA, MHSWR, CDM and EWR should be incorporated into device operation plans and associated Developer SMS.

Requirement	Details
Device Operation - Key Developer Safety Management Requirements	• PTO, Berthing Agreement, Insurances and Marine Licence must all be in place and terms adhered to throughout. • The technology installed must be operated to the accepted engineering validation studies including but not limited to: o Third Party Validation of Device and Mooring Design as set out in MOR-002 (acceptance by WHL and the MMO) o Electrical System Connection Specification Compliance – FEED Study and Detailed Design Review (WHL) o TNEI Electrical Stability Study (accepted by WPD) o Electrical System and SCADA Pre-Deployment Tests (witnessed by WHL) Where changes to Device design are proposed that impact on any of the approved engineering studies, then further tests and verification (to be agreed with WHL and the relevant stakeholders) must be completed and the PTO varied accordingly prior to implementation. • Signed-off developer Safety Management System (SMS) and detailed operational plans (*see MOR-016-Developer Safety Management Requirements*) to be applied throughout and reviewed at least annually by the Lead Engineer and HSEQ Advisor. The HSE are particularly keen to assist Developers in the early stages of project safety planning. Useful contacts within the HSE Renewable Energy Team are: Trevor.Johnson@hse.gsi.gov.uk (Manager) and Steve.area11.Lewis@hse.gsi.gov.uk (Inspecter). • Compliance with the Wave Hub ASMS and consideration of Autonomous Global Navigation Satellite System (GNSS) tracking on every surface or near surface device – this requirement is to be agreed on a case by case basis with the MCA (see also the Wave Hub ASMS). *WHL and the Coastguard are to be granted access to the monitoring system data where this requirement is confirmed.* • Preparation and resourcing of detailed Emergency Response Plans (ERPs) and update of the Wave Hub ERCoP for the Construction, Operational and Decommissioning Phases. Attendance at organised collective emergency response exercises to be held each autumn. Developers must ensure that every project vessel carries an offshore works safety file including the relevant permits and emergency response plans. • At least one competent local project or site manager (<1hr from Hayle), authorised to plan and lead operations or emergency intervention during the device deployment.

Device Operation - Key Developer Safety Management Requirements *(continued)*	• Provision of a 24/7 onshore duty manager with dependable duty phone (*will be tested periodically by MCA and WHL*). • Access to validated (*see MOR-004*) service vessels (locally stationed) with inducted crews, sufficient to ensure 100% availability 24/7 and capable of facilitating the emergency response requirements of the Developer (*particularly device adrift recovery*). • Accidents, incidents, near misses and non-conformances shall all be reported to WHL promptly using the Developer's own safety management forms. **The Wave Hub Duty Manager must be informed of accidents or incidents immediately by the Developer's Onshore Duty Manager by phone and copied-in on accident/incident reports within 24Hrs**. If insufficient, the Wave Hub Duty Manager may request that *FORM-M007 Accident-Incident Report* is completed. Where a non-conformance is raised against the activities of a Developer, WHL may request that *FORM-M009 Non-conformance and Hazard Report* is completed and that the corrective actions agreed are implemented and verified before further related activities can proceed. *In safety critical instances, the Permit to Operate may also be suspended.* • In support of the industry, WHL also encourages Developers to submit health and safety data to RUK's RISE database: https://www.renewablesafety.org/ • All scheduled works must be properly planned and risk assessed by a competent person. All work should be adequately controlled and only undertaken by qualified and competent operators with suitable equipment and supervision. Thorough toolbox talks should be completed by the works lead before commencing operations offshore with all personnel attending. • Unplanned intervention and change of scope during planned works must be adequately controlled, risk assessed and approved by Developer management at an appropriate level (*change management system and onsite risk assessment*). • Developer must ensure that vessels, plant, tools and materials, safety equipment and PPE is fit for purpose, well maintained and thoroughly checked before each use by a competent person. *Equipment maintenance logs will be checked annually by WHL.* • Repeated procedures must be continually reviewed and updated with improvements recognised through experience. Where relevant, device access systems and procedures must be particularly carefully considered and reviewed at least annually. • The device must be maintained to a safe and serviceable standard for the duration of an offshore deployment. • Under a Developer's Permit to Operate, a Wave Hub Permit for Special Operations (*FORM-M016*) is required for any operation that could affect neighbouring site users and/or WHL. This primarily includes installation activities, diving, major maintenance operations and decommissioning of equipment. These permits shall be applied for with supporting information as stipulated in MOR-008 and at the end of Form-M016 and in good time.

Marine Operations Requirement (WAVE HUB-OMS-MOR-008)

Wave Hub Offshore Site Safety

General marine co-ordination processes and duties that apply to all WHL controlled or permitted Operators on the Wave Hub offshore site.

Requirements

1. **Communication Requirements**
   a. All valid and applicable Wave Hub **Permit**(s) and **ERPs** must be in place and posted on the bridge of operational vessels
   b. Where necessary, WHL will issue a **Notice to Mariners** (***MOR-012***) to keep third party mariners informed
   c. Planned access must be notified to WHL and other permitted site users in accordance with the **Offshore Site Access Procedures (*MOR-009*)** using the **Wave Hub OPANS**. OPANS conflict notifications must prompt Operator **co-operative works planning** to mitigate programme and working area clashes requiring further **SIMOPs** controls.
   d. **Emergency** communications shall be by phone and key offshore and onshore duty holders nominated for this purpose.

2. **Infrastructure Proximity Guidelines (*minimum base case proximity, subject always to risk assessment of site and vessel specific factors*)**

Zone or Infrastructure	Minimum Third Party Clearance	Permitted Operations
Wave Hub	**500m** Safety Zone (*centered on the subsea Hub*) (*Further reference: MCA MSN 1290 Offshore Installations – Observance of Safety Zones*)	Asset Surveys Wave Rider Buoy Servicing SW Boundary Special Mark Servicing Approved Electrical Infrastructure Works
Wave Hub Aids to Navigation	**250m** from Advised Assigned Positions (*swing/work radius*)	Trinity House Contracted AtoN Servicing
Developer Under-Leased Areas	**100m** from Red-Line Boundary (***Note: the under-leased red-line is an infrastructure and operational boundary***)	Permitted Developer Operations
Wave Hub Subsea Cables (out of the Wave Hub Safety Zone)	**250m** from Wave Hub Main Export Cable to shore **120m** from Wave Hub Tails and Extensions*	Approved Electrical Infrastructure Works Asset Surveys

Note: *Stand-by mooring off-site must be >1000m from the Wave Hub charted development area and associated infrastructure.*

Reference: The Crown Estate 2012 'Submarine Cables and Offshore Energy Installations – Proximity Study'.* ***It is recognised and highlighted that while 120m clearance on the subsea cable tails will maximise the effective and usable Development Area, it will at the same time, likely result in very strict vessel selection, operating sea and weather constraints, to be agreed in each case through robust planning and risk assessment with the vessel master in attendance.*

Please refer to the latest 'Wave Hub Asset Location Database' available on the Box file sharing system for up to date infrastructure position lists.

3. Operation Categories

Operation Category	Definition	Vessel Type	Operation Type	Minimum Notification
Emergency Response	*Defined as any critical access essential to safeguard personnel and maintain safe operating conditions across the site.*	Any task appropriate validated vessel	• Operating Vessel Emergency * • Personnel Accident or Emergency * • Infrastructure Emergency *	*To be notified at time of incident.*
Major or Complex Operations Planning	*Defined as any large vessel (>30m LOA) or complex / higher risk offshore operation requiring greater levels of safety clearance and inter-operator co-operation.*	Any task appropriate validated vessel or vessels	• Device Deployment ® ϕ Ω • Major Device Maintenance or Alteration ® ϕ Ω • Diving Operations ® ϕ • Device Decommissioning ® ϕ Ω • Wave Hub Subsea Cable Maintenance β Ω • Geotechnical Survey ® ϕ β • Wave Hub Navigation Mark Maintenance β	4 Weeks 4 Weeks 2 Weeks 4 Weeks 4 Weeks 4 Weeks 4 Weeks
Minor Operations Planning	*Defined as any small vessel (<30m LOA) access for routine or minor operations within permitted working areas.*	Any task appropriate validated small commercial vessel or vessels	• Routine Device O&M ® • Surface Equipment Visual Inspection β ® • Subsea Equipment ROV Inspection β ® • Wave Hub Planned Electrical Switching ® Ω • Geophysical or ROV Survey β ® • Environmental Survey β ® • Wave Rider Buoy Maintenance β ® • Substation Unplanned Power Outage Ω	1 Day 1 Day 2 Weeks 2 Weeks 2 Weeks 2 Weeks 2 Weeks Unplanned

Note: *the above encompasses planned operation notification. Actual site access within a planned operation window (as notified) must be communicated and reported as set out in* ***MOR-009 Offshore Site Access Procedures****.*

Applicable Permits *(more than one symbol denotes more than one permit applies or an alternative permitting route may be available):*

* Emergency Access is Permit Exempt but must be covered by the validated Operator ERP / SMS

ϕ Developer Permit for Special Operations AND Developer Permit to Operate

β Contractor Permit to Operate

® Developer Permit to Operate

Ω Wave Hub Electrical HV Permit to Work System (wherever onshore isolation is required or prudent)

4. Operation Proximity Guidelines

Allowable minimum working proximity limits (*point of closest vessel approach*) are in general defined for the Wave Hub offshore site as follows:

Operation Proximity Matrix	Major or Complex Operation	Minor Operation
Major or Complex Operation	1000m	500m*
Minor Operation	500m*	100m
Unrelated Wave Hub Offshore Infrastructure and Other Developer Red-Line Areas	*As defined in Section 2*	

** 300m may be allowed by agreement with the major or complex operation vessel master in question, except **for diving operations where a 500m temporary clearance zone is always required**.*

Under maritime law the Master has overall legal responsibility for the safety of his vessel, the personnel on board, and the protection of the environment, and we acknowledge this in the development of these proximity guidelines. As such, it is strongly encouraged that due consultation with masters should form part of the operational planning to confirm or vary the working safety clearances and environmental conditions required. Specific task clearances agreed must be notified through OPANS.

Notes and conditions

a) Any extra-ordinary clearance must be notified to WHL and on OPANS

b) Only one Operator handling Wave Hub cables shall be permitted at any one time on site regardless of proximity.

c) Where agreed clearances are achieved, a formal SIMOPs briefing and communications plan is not required but it remains essential that Operators communicate and co-operate with one another throughout on a designated VHF channel.

d) These guideline base case minimum clearances may be varied at the discretion of WHL with operational experience.

e) Please note: to achieve the guideline clearances above, major or complex operations can partially preclude routine access within proximal under-leased Developer berths. This will be particularly true during device, cable and moorings installation works, and co-operation and patience by all site users will be required (*see also operation precedence notes below*).

f) *These minimum guidelines offer a reasonable resolution to the conflicting requirements of conventionally large offshore working safety margins with a compact and diverse site with multiple permitted users. They do not in any instance waive the legal duties of any Operator under IMO conventions: **SOLAS, STCW, COLREGS, MARPOL**, and **SAR** as applied through the **UK MCA Maritime Regulations.***

5. General Operator Co-operation and Precedence Guidelines

Where proximity conflicts arise due to major or complex operations, access shall be co-operatively managed as follows:

i. All operations in-progress must co-operate and assist where safe to do so in response to an emergency.

ii. Where notified, WHL critical offshore infrastructure works shall take precedence (*ensuring a healthy export cable and availability of deployment site aids to navigation is critical to all Developers*).

iii. For all other operations:

a. Minor operations shall defer to major or complex operations. Minimum clearances should be maintained where possible (*unless explicitly waived by the major or complex operation vessel master in question*) and any instructions from the major or complex operation master followed in good time.

b. Multiple conflicting major or complex operations with date and proximity overlaps should be co-operatively planned in advance to effectively use the available operating areas and/or operating times to achieve all objectives without proximity conflict. However, where simultaneous operations become unavoidable, pre-commencement SIMOPs planning must be completed (*see SIMOPs notes below*).

c. Should there be any further dispute or safe working conflict during SIMOPs then major or complex operations will where necessary be prioritised on a first come first served basis (*referencing the original permit issue date*)*. Where an operation is judged to hold primacy (as notified by WHL), then any permitted secondary operation affected must defer accordingly.

WHL will, as part of the on-going safety monitoring of the site check that safe working clearances and transit gates are adhered to through the AIS offshore site management system. Failure to co-operate and communicate adequately with other permitted site users and WHL may result in permits being suspended.

**WHL holds total discretion over operational priorities in arbitration of disputes.*

6. SIMOPs Requirements

a. It is the Developer's responsibility alone to undertake SIMOPs planning and safeguarding (as set out in the Developer's SMS) where multiple vessels are utilised for concurrent operations within their own sub-leased operational area – termed **Internal SIMOPs**. Typically a well-attended HIRA will incorporate the SIMOPs planning for a Developer proposing multiple vessel intervention.

b. Where two or more unavoidable **major or complex** operations occur within safe clearances at the same time, involving two or more independent permitted site users, an **External SIMOPs** may result. In all such cases a **Simultaneous Operations Briefing** must be held and WHL must validate the resulting **Simultaneous Operations Communications Plan (FORM M002**) before works proceed.

c. The shared duties of the various Operators involved are to conduct a review of the identified risks and mitigation measures to be applied, establish specific ERP's, and develop the combined communications plan for review. When a SIMOP then commences on-going co-operation and communication is essential throughout on a designated VHF channel.

d. The first **External Simultaneous Operations Briefing** should include key operations management as well as vessel masters and take place face to face. Thereafter, arrangements should be made for daily briefings to ensure that the mitigation measures are correct and current. This may take the form of a conference call or similar if a physical meeting is not practical.

e. The External **Simultaneous Operations Communications Plan** (**FORM M002**) will set out clearly the communications arrangements for all activities taking place at any time during SIMOPs. It will include:
   i. The Operators and operation titles.
   ii. The names and positions of those in overall charge of marine operations.
   iii. The names of the marine coordinators.
   iv. Telephone numbers for key personnel including vessel masters.
   v. VHF channel allocation.
   vi. Details of any positioning equipment both surface and sub-sea which could interfere with (or be affected by) other equipment in use nearby.
   vii. Details of internal communications such as UHF frequencies being used by each operator.
   viii. Vessel names, VHF call-signs, MMSI numbers and ship's phone numbers.

IMCA Guidance: IMCA M 203 – Simultaneous Operations (2010)

Internal References:
Wave Hub Asset Location Database
Simultaneous Operations Communications Plan (FORM M002)
Notice to Mariners (MOR-012)
Offshore Site Access Procedures (MOR-009)
Wave Hub OPANS User Guide
FORM-M014 Developer Permit to Operate
FORM-M016 Permit for Special Operations
FORM-M015 Contractor Permit to Operate

External References:
The Crown Estate: Submarine Cables and Offshore Energy Installations – Proximity Study (2012)
UK MCA Maritime Regulations: https://www.gov.uk/guidance/shipping-industry-regulation
MCA Guidance: MGN372 – Offshore Renewable Energy Installations – Guidance to Mariners
MCA Guidance: MIN357 – Guidance for Avoiding Dangerous Situations in Adverse Weather
MCA Guidance: MGN315 – Keeping a Safe Navigational Watch on Merchant Vessels
MCA Guidance: https://www.gov.uk/offshore-renewable-energy-installations-impact-on-shipping#further-information
MCA Notice: MSN 1290 Offshore Installations – Observance of Safety Zones
IMCA Guidance: IMCA M 203 – Simultaneous Operations (2010)

Useful UKHO Admiralty Charts:

- ***Admiralty Chart 1149 – The Wave Hub Offshore Site***
- *Admiralty Chart 2565 – Falmouth to Wave Hub Transits*
- *Admiralty Chart 1168 – Harbours on the North Coast of Cornwall*
- *Admiralty Chart 0154/0032/0018 – Approach to and Detail for Falmouth Harbour*

SeaFish Kingfisher (KIS-ORCA) Fishermen Cable Awareness Charts: http://www.kis-orca.eu/map

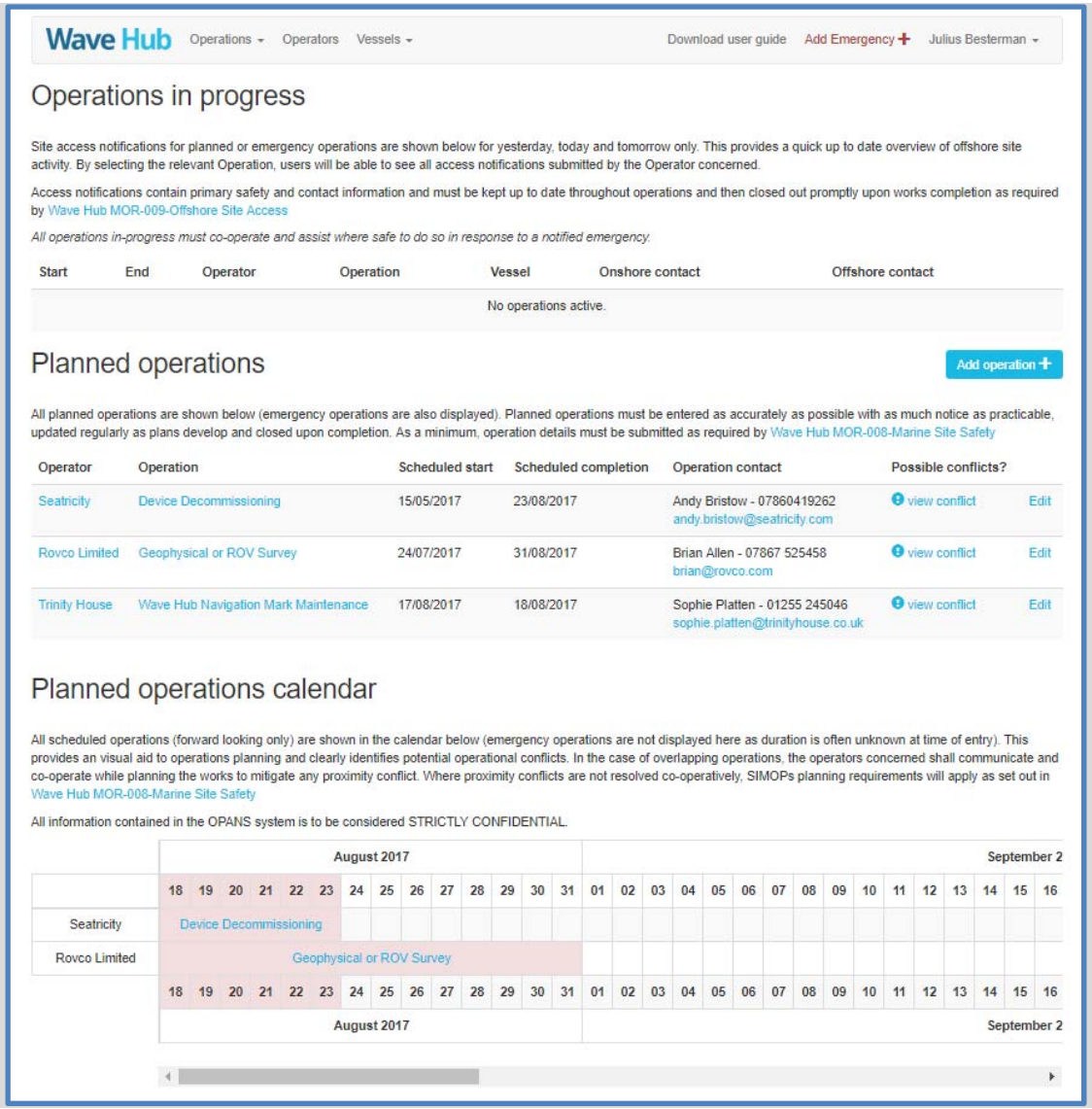
Marine Operations Requirement (WAVE HUB-OMS-MOR-009)

Wave Hub Offshore Site Access Procedures

Marine site access processes apply to all WHL controlled works on the Wave Hub offshore site.

Task	Requirements
Operating Notification Requirements	**Operation planning and notification:** • The Operator is expected to notify, co-ordinate and co-operate with all other WHL permitted site users. This is facilitated by WHL through use of the Wave Hub On-line **Operation Planning and Access Notification System (OPANS)** which all Operators must subscribe to, monitor and keep up to date. WHL will give all permitted Operators system access and the online User Guide gives further information on how to use the system efficiently and effectively. • The Operator is required to **add every Operation** in advance (the minimum operations notice is specified in ***MOR-008***) and regularly update and edit the operational details as plans develop. The operation must be closed on completion or where aborted and the reasons for closure reported. Where Operation windows overlap cooperative planning is required. • Within a notified Operation on OPANS, the **Operator's Onshore Duty Manager** shall accurately complete **Site Access Notifications** (at least 12 hours before access) and **Site Access Reports** (within 2 hours after access) for each vessel access to site in relation to that operation. Access reports must be filed even if access is aborted before site access is made. The Operator Onshore Duty Manager must update the system immediately whenever schedule or safety changes are made by editing the relevant notification. These notifications provide critical progress / safety / contact information to WHL and other Operators on site and will be shared with the Coastguard Operations Centre in an emergency through the Wave Hub ERCoP. • If OPANS is unavailable, site access notification/reporting may be temporarily facilitated by the Operator Onshore Duty Manager filing **FORM-M010 Offshore Site Access Log** by email to the Wave Hub Duty Manager and WHL Head of Operations (at least 12 hours before access and within 2 hours after access or where schedule or safety changes are made). To ensure safe works coordination between Operators when OPANS is down, the Wave Hub Duty Manager or WHL Head of Operations will inform the Operator Onshore Duty Manager if any other access has been notified and of the relevant contact details. • The Wave Hub **AIS monitoring system** will automatically alert the WHL Head of Operations when any notified vessel enters or exits the Wave Hub offshore site. The Wave Hub Duty Manager will log on to this system during a notified emergency. • **Emergency communications** shall be by phone and key offshore and onshore duty holders must be nominated and contact details clearly shown in the Operator's ERP. Please note the primary communications between Operator and WHL will be between the Operator Onshore Duty Manager and the Wave Hub Duty Manager. The Operator is to ensure adequate onshore to offshore lines of communication between duty holders are available at all times whilst operations are in progress.

Operating Notification Requirements *(continued)*



OPANS Homepage Screenshot.
This overview shows planned operations ahead in calendar form, the nature of the operation and contact for advanced cooperative planning, and safety / communications details for operations in progress based on submitted vessel specific access notifications.

Operating Notification Requirements *(continued)*	***Access Conditions:*** I. A discreet offshore site access is deemed to have ended where the vessel leaves for more than 6 hours or returns to port/shelter. In any such instance, the access notification must be closed out with a report and a new entry submitted prior to the next planned access. II. Where additional controls and input to the co-ordination and planning of external SIMOPs is required prior to operation commencement, full co-operation is mandatory – even if this delays the works. III. Good co-operation and communication between all parties is central to making the most efficient and safe use of the site. Permits may be suspended where Operators do not work collaboratively. IV. Offshore site access is subject always to a valid permit posted in all key operational locations, via allocated transit gates (if specified), always avoiding other operational areas and third-party infrastructure, within the working areas or boundaries specified and in full compliance with Marine Licence conditions. V. Safe access is not assured under any permit and vessel masters are ultimately responsible for offshore vessel safety. VI. All Operations in-progress must co-operate and assist where safe to do so in response to a notified emergency.
Wave Hub VHF	Station Name: '**Wave Hub Coast-Station**' Channels Licensed for Use (*Ofcom Coastal Station Radio Area Defined License: 0978104/1*): • **16 - Emergency** calling and vessel hailing only • **11 and 71 – Operations** ***Radio usage note*:** WHL does not monitor the VHF constantly and will only be available on a selected operations channel when agreed with an Operator or if issuing urgent safety alerts. *Local Radio Usage Notes:* • St Ives and Hayle Harbour Authorities both monitor channel 16 and operate on channel 12 during business hours. • The "St Ives National Coastwatch Institution (NCI)" Coast-Station Radio monitors and responds on 16, P1 and 65 during daylight hours only.

Wave Hub Site Access Contacts:
Wave Hub Duty Manager *(Available 24/7) - Email*: duty.manager@wavehub.co.uk - ***Duty Mobile*: 07818 573180**
WHL Head of Operations - *Email*: julius.besterman@wavehub.co.uk - *Mobile*: 07918 630852

Marine Operations Requirement (WAVE HUB-OMS-MOR-010)

Emergency Response Requirements – Responsibilities, Coordination and Cooperation

Applies to all permitted Developer activity on the Wave Hub offshore site – context for development and integration of Developer ERPs.

<table>
<tr><th>Scenario</th><th>Tasks</th></tr>
<tr><td>Incident Command</td><td>Whilst the Offshore Incident Command oversees the scene and critical controls offshore, the Operator Duty Manager (always onshore and contactable) remains responsible for communications externally. The Operator's Offshore Incident Command must therefore keep the Operator Duty Manager up to date throughout.
<table>
<tr><th>Asset or Operation</th><th>Onshore Duty Holder</th></tr>
<tr><td>Wave Hub Infrastructure</td><td>Wave Hub Duty Manager (WHDM)</td></tr>
<tr><td>Permitted Operations / Infrastructure</td><td>Operator Duty Manager (ODM)</td></tr>
<tr><td>SAR Response</td><td>Coastguard Operations Centre (CGOC)</td></tr>
<tr><th>Asset or Operation</th><th>Offshore Incident Command</th></tr>
<tr><td>Permitted Operations / Infrastructure</td><td>Offshore Operations Manager</td></tr>
<tr><td>Vessel</td><td>Vessel Master</td></tr>
<tr><td>Diving or ROV</td><td>Dive or ROV Supervisor</td></tr>
</table></td></tr>
<tr><td>Key Principals</td><td>• In general, the Wave Hub Duty Manager will liaise with the active Operator Duty Managers (onshore) during emergencies.
• Developers must configure and monitor appropriate fault condition alarms and keep these systems well maintained.
• Developer ERPs (and key contact numbers) must be reviewed at least annually and after any incident.
• All duty holders must have ERPs, key contacts and supporting information to hand at all times.
• Emergency communications between Duty Managers shall be via phone (a dedicated duty number must be maintained).</td></tr>
<tr><td>Personnel Training</td><td>• Duty holders must all be trained and competent for the role.
• In the event of an emergency, duty holders involved should where possible maintain an individual log of events (FORM-M008 Emergency Response Log or equivalent) to be used later in the incident review or investigation.
• Emergency response procedures shall be covered in project inductions for all new personnel.
• All personnel must be encouraged to report fault conditions, dangerous occurrences and any safety concerns or observations. Reported matters must be dealt with promptly and appropriately by the Operator.
• Attendance of key duty holders at emergency response table-top exercises annually (each autumn) including Developers, MCA SAR Operations HQ, CGOC and WHL as a minimum.</td></tr>
</table>

Operator (Contractor or Developer) Emergency

Outline Emergency Flowchart – Developer and WHL Interfacing

The ODM concerned must implement their applicable **ERP** and coordinate the critical response until safe resolution

In all cases the ODM must ensure that the CGOC and WHDM are kept informed of all relevant detail throughout

WHDM to commence communications log and check CGOC has been informed (flagging ERCoP for safety information)

Where a threat to other sea users is posed (device/vessel adrift), the UKHO must also be informed by the ODM

ODM to inform Police (criminal damage or fatality), MMO (Marine Pollution) or Receiver of Wrecks (wreck discovery)

WHDM to shut down system if justified. WHDM to notify WHMD and WHHO (WHHO will issue NtoM if necessary)

WHDM to notify other ODMs where operations or infrastructure may be affected or at risk (e.g. electrical isolation)

ODM to ensure details are promulgated to other affected ODMs. Any planned vessel response must be added to OPANS.

WHDM to monitor situation and ensure ODM is communicating effectively to all parties involved (assisting as required)

On resolution of critical response phase, ODM to update all parties and circulate an Incident Report within 24hours

Where applicable, the Operator is to report the incident to the appropriate authorities within regulation deadlines (Police / HSE / MMO / MCA / MAIB/ TH)

Wave Hub will agree with the Operator the level of internal investigation required and the corrective actions that result (FORM-M009 Non-conformance and Hazard Report)

ODM to update OPANS with planned emergency remedial works as usual.

All relevant Operator ERPs must be reviewed and updated with lessons learnt.

Emergency Information Exchange	The ODM should where possible provide the following information to the WHDM when an incident is reported: 1) Location (WGS84 Lat/Long) as accurately as possible 2) Time of incident / Time of report 3) Incident Summary (including details of Injuries / Damage) 4) Hazards & Weather Conditions 5) Emergency Services Informed, Assistance Required or Attending 6) Operator Response Planned 7) Key Contact Details and Parties Informed to date The WHDM and ODM must then agree actions and further contact.
Investigation and Reporting	• All accidents and incidents shall be reported to WHL using ***FORM-M007 Accident-Incident Report*** or an acceptable Developer equivalent within 24Hrs. • In all cases where an incident or accident is externally reportable or otherwise at WHL's discretion, thorough internal investigation shall be completed by the Developer concerned (including specialist assessment where required) and corrective actions agreed with WHL using ***FORM-M009 Non-conformance and Hazard Report*** or an acceptable Developer equivalent. ***References:*** - *HSE HSG245 – Investigating Incidents and Accidents:* http://www.hse.gov.uk/pubns/books/hsg245.htm - *MAIB Information Leaflet:* https://www.gov.uk/government/publications/maib-information-leaflet - *IMCA SEL016 Guidance: The Investigation and Reporting of Incidents*

Acronym Definitions:		
AIS: Ship Automatic Identification System	**NOK**: Next of Kin	**TH DO**: Trinity House Duty Operations
CGOC: Coastguard Operations Centre	**NtoM**: Notice to Mariners	**WHMD**: WHL Managing Director
ERCoP: Emergency Response Coordination Plan (WHL, Permitted Operators and MCA)	**ODM**: Operator (Contractor or Developer) Duty Manager (Onshore)	**WHDM**: Wave Hub Duty Manager
ERP: Emergency response Plan	**OIC**: Offshore Incident Command	**WHHO**: WHL Head of Operations
Fugro DM: Fugro Duty Manager (Wave Data Contractor)	**OPANS**: The Wave Hub Operations Planning and Notification System	**UKHO**: Radio Navigation Warnings
MMO: Marine Management Organisation – Pollution Response	**SCADA**: Wave Hub Supervisory, Control and Data Acquisition System	**UXO**: Unexploded Ordnance

Marine Operations Requirement (WAVE HUB-OMS-MOR-011)

Diving and ROV Operations

These requirements apply to all controlled Diving Operations on the Wave Hub offshore site. Diving is a hazardous activity and wherever possible designers should seek to design out the need for diving or provide for alternative subsea handling methods such as ROV intervention.

Task Owner	Requirements
Responsibilities of the Selected Dive Contractor	• Work in compliance with the **Diving at Work Regulations (DWR) 1997 and all other relevant regulations and best practice** • Work in compliance with the most appropriate (selected from Risk Assessment) HSE Commercial Diving Approved Code of Practice (ACOP). Typically, these are: **Commercial Diving Projects Offshore** (***HSE ACOP L103*** – where depth exceeds 50m or diving from a DP vessel) or **Commercial Diving Projects Inshore** (***HSE ACOP L104*** – within the 12NM limit unless L103 applies) • Have **membership of a recognised trade or professional body** and **relevant diving experience** • Hold relevant **insurances** ***(Employers Liability Insurance that covers diving operations, Third Party Liability Insurance sufficient to indemnify the asset owner)*** • Complete a site-specific **Dive Plan** inclusive of **Risk Assessment and Emergency Response Plan (ERP)** for each diving operation; disseminate the plan to the team; keep the plan updated as required; apply all required **HSEQ procedures, checks and permit arrangements** to the operation**.** Ensure that the **ERP** is clear and effective, reflects Developer and WHL requirements and includes prepared access to first aid and medical treatment (particularly transport to and pre-arranged use of decompression facilities). ***Dive Contractor Onshore Duty Manager and Dive Supervisor Contact Details must be included.*** • Ensure a competent and experienced **Dive Supervisor** is appointed (in writing) with on-site responsibility for the safety management of the operation • Ensure that there are suitable and sufficient **Divers** who are competent (**HSE approved qualifications**) in both diving and the actual work to be undertaken, such as in the use of tools; and who hold a **valid HSE MA2 certificate of medical fitness to dive** • Ensure that the **vessel or platform** from which the diving is to be carried out is fit for purpose, stable and safe; and that a safe means of **access/egress** is available to the Divers. • Safe systems of work should be enforced to prevent divers from **suffering injury from vessel propulsion systems.** • **Dive vessels must always display the appropriate AIS status and lights or shapes whilst diving works are in progress.** • Provide sufficient and suitable **plant, tools and equipment**, and ensure that it is correctly inspected, certified and maintained • Maintain proper **records of the diving operation**; and disseminate **Accident/Incident reports** to the Client and WHL • Ensure that there is **continuous and adequate communication** between the Dive Supervisor and the Divers in the water • Check the **site conditions** on the day of the dive, make **go/no go calls** for the dive works, and when conditions change, confirm that the Risk Assessment is still current and if the work may safely proceed

Responsibilities of the Party Contracting the Dive Services	• If diving operations are foreseeable and unavoidable, then the Dive Contractor should be consulted in the design and planning phase to ensure **diver-friendly systems** are installed • Safety clearances as per ***MOR-008 Offshore Site Safety*** must be planned and maintained in respect of other controlled operations (*consider safety boat or duty watch on VHF to keep uncontrolled third-party vessels at safe distance*). • Ensure Dive Contractor compliance with the **Diving at Work Regulations (DWR) 1997,** the appropriate **HSE Commercial Diving Project ACOP (L103/L104)**, and the requirements of the **RUK Offshore Wind and Marine Energy Health and Safety Guidelines, Issue 2, 2014, Section C18 – Subsea Operations** • Supply the Dive Contractor with all relevant task, vessel, site and offshore infrastructure/device **information** including all **identified hazards and controls** • Check the **competence and relevant experience** of the Dive Contractor (**contractor HSEQ assessment, professional certification and insurances**), Dive Supervisor (**CV and competency certification**) and the Divers (**competency and medical certification**) ensuring always that the **Full Dive Team** is mobilised in accordance with the risk assessed plans and ACOP • Input to and sign off (*by a competent person experienced in commercial dive operations*) on the **operation specific Dive Plan** (**including Risk Assessment and ERP**). *The Dive Plan shall assess the work scope with respect to the tidal regime for the site and suitable tide data, procedural hold points and contingencies shall be clearly identified.* • As appropriate to the task, run a **tool box talk** (on site) and/or **HIRA** (in advance) with the dive team before commencement of operations; covering **RAMS, interfaces with offshore infrastructure/Device** and coordination with other works. • Ensure an **appropriate vessel** is utilised for the works (*approved by the Dive Contractor*) and which is compliant under ***MOR-004.*** Diving from dynamically positioned vessels can be hazardous to divers because of the presence of rotating propellers and thrusters and should be avoided wherever possible. *Practical steps should be taken to prevent a diver or their umbilical getting too close to a thruster or propeller of any vessel* (*reference: IMCA D 010 Diving Operations from DP Vessels*) • **Ensure the site is safe to use** and co-operate with the Dive Contractor permit to work systems; facilitate isolation and tag-out; control works above the Divers at all times • **Co-operate and assist in the event of a dive emergency** (Dive Supervisor is Offshore Incident Command – see ***MOR-010***) • Ensure plenty of slack is maintained in surface to seabed tethered systems while sub-surface work is being undertaken on tethers to avoid snatching • Ensure **constant communications with the Dive Supervisor** is maintained; encourage the use helmet dive camera and live feed to increase effectiveness of surface instructions where necessary • Ensure dive works only commence on a **suitable and stable or improving forecast** (to be agreed with the Dive Supervisor)

WHL Validation of Operator Diving Activity	• Diving is a controlled activity requiring a **permit in all instances: either a Contractor Permit to Operate (FORM-M015) or a Developer Permit for Special Operations (FORM-M016).** • No diving work may go ahead without a **competent Dive Contractor** being appointed. The Dive Contractor has the main responsibility under DWR to ensure a safe diving project. WHL will validate as a minimum the **works and site-specific Dive Plan** (including ERP and Risk Assessment), **valid Dive Contractor professional certification**, **valid and sufficient Dive Contractor insurance certificates and Dive Supervisor competency certification** prior to issuing a permit to the Operator managing the diver intervention. *Where required, additional information may be requested by WHL*.
ROV or WROV Operations	**The ROV Contractor** has overall responsibility for the management and team structure for an ROV operation. Particularly, the operating parameters of the selected ROV must be fit for purpose with respect to the task, local conditions and the vessel support to be used. Key hazards are those related to ROV / umbilical interaction with the support vessel. DP vessels generally have particular and inherent limitations for ROV operations, namely continual risk from thrusters, propellers and their wash that must be carefully managed. For critical tasks, such as work on subsea cables, unplanned repair and spares availability should be considered to minimise downtime. **The ROV Supervisor** has direct operational responsibility for the planned ROV works (acting as Offshore Incident Command in the case of an ROV emergency – see ***MOR-010***). The ROV Supervisor shall ensure that the competency of the pilots is fit for purpose and that all examinations, maintenance, tests and certifications are in place for the mobilised ROV. The Supervisor is responsible for the quality and safety of the work delivered through effective implementation of the ROV Contractor's SMS and agreed RAMS. **The selection of a fit for purpose ROV** should include but not be limited to assessment of: power and drive or propulsion system, tooling and instrumentation, positioning sensors and systems (cameras, fluxgate compass, obstacle avoidance sonar, USBL), tether management requirements and consideration of operating limits with respect to the expected site conditions: • Underwater visibility and lighting • Current strength and thrust requirements (*particularly for free swimming vehicles*) • Seabed topography (*sudden changes can cause sudden movement or instability of tracked or skidded vehicles*) • Sediment conditions (*for jetting or trenching ROVs*) • Water depths • Sea state limitations (*particularly for launch and recovery*) • Proximity of cables and other structures *(subject always to Risk Assessment - and use of an appropriate vessel, ROV and tether and competent operators - tracked ROVs may be operated in close proximity to subsea structures and cables).* ***In all cases the support vessel and particularly the launch and recovery systems must be compatible with the ROV.***

ROV or WROV Operations (*Continued*)	No ROV work may go ahead without a **competent ROV Contractor** being appointed. WHL will validate as a minimum the **WROV specifications**, **work and site-specific RAMS and ERP, WROV Supervisor competency and experience, WROV Supervisor contact details** and the **WROV maintenance log** prior to permitting WROV operations on Wave Hub infrastructure. The vessel operator shall also confirm that the vessel third party liability insurance is valid for vessel use in support of ROV operations. **Where ROV inspection footage is to be supplied to WHL, the following requirements apply:** a. Anomalies or concerns shall be reported immediately aided by screen shots so that appropriate corrective action may be agreed. b. ROV footage shall be supplied with the following overlay: commentary, component name, location, depth, heading, date and time. c. The produced footage shall be supplied to WHL within four weeks of completion of the works with a clear index of file names referencing the time stamps and associated locations covered within each file. d. Any inspection class ROV shall, as a minimum be equipped with: i. Obstacle avoidance sonar ii. Digital video camera iii. Pan and Tilt cameras iv. Fluxgate compass v. USBL transponder e. The ROV footage + commentary should be captured by a CSWIP qualified marine survey/inspection engineer f. All positions to be quoted to WHL in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes ***ROV Operations References:*** - *Renewable UK 2014 Marine Energy Health and Safety Guidelines – Subsea Operations* - *IMCA R 004 – Code of practice for the safe & efficient Operation of Remotely Operated Vehicles.* - *IMCA R 005 – High Voltage Equipment: Safety Procedures for Working on ROVs.* - *The Crown Estate 2012 'Submarine Cables and Offshore Energy Installations – Proximity Study'.*
Diving or WROV Handling of the Wave Hub Subsea Cable	***WROV or Diver handling of Wave Hub subsea cables:*** The Wave Hub Electrical Safety System applies and specifically cables must be isolated and earthed, and a Wave Hub ***Offshore HV Permit to Work*** (***EOP-009***) issued to the Contractor's Supervisor before works commence. **(See also: *MOR-003 Wave Hub Cable and Connector Handling*).**

Safe Diving Management References:

- RUK Offshore Wind and Marine Energy Health and Safety Guidelines, Issue 2, 2014, Section C18 – Subsea Operations
- For further information on UK diving legislation please refer to the HSE website: http://www.hse.gov.uk/diving/
- The HSE summary Diving at Work guidance leaflet may also be a useful quick reference: http://www.hse.gov.uk/pubns/indg266.pdf
- Access to HSE Diving ACOPs: http://www.hse.gov.uk/diving/acop.htm
- HSE Diving Hazards – General Information Sheet: http://www.hse.gov.uk/pubns/dvis1.pdf
- International Marine Contractors Association (IMCA) Diving Division: http://www.imca-int.com/diving-division.aspx
- Association of Diving Contractors UK (ADC) – Code of Practice for Diving on Renewable Projects: http://www.adc-uk.info/website/info/publications
- Diving Medical Advisory Committee: http://www.dmac-diving.org/
- MCA Notice: MSN 1221 - Dynamically Positioned Vessels and the Dangers to Divers Operating from such Vessels

For further assistance and reporting of incidents please contact:

Nick Deppe
HSE Energy Division – Diving Specialist Inspector
diving@hse.gov.uk

Wave Hub

Marine Operations Requirement (WAVE HUB-OMS-MOR-012)

Notice to Mariners

To ensure that where WHL Contractor or Developer works are planned or where new safety concerns arise, the appropriate authorities, research organisations, local fishing community, mariners and other permitted Operators are informed in good time.

Task	Requirements
Trigger Events	• New offshore infrastructure or device installation (including creation of any related sub-leased red-line area) • Offshore infrastructure or device decommissioning (including dissolution of any related of sub-leased red-line area) • Cable operations • Works on Wave Hub Aids to Navigation • WHL contracted or Developer geophysical or geotechnical survey works • Any operation that significantly exceeds previously notified parameters • Any operation that requires a notified safety clearance (for example: diving operations) • Any operation stipulated in a WHL or Developer Marine Licence as requiring a Notice to Mariners • Any operation that presents new risks to third-party mariners • Any operation where a vessel engaged in WHL controlled activity is restricted in their ability to manoeuvre. ***The decision as to whether a formal Notice to Mariners is required is at the discretion of WHL and the MMO.*** ***All formal Notices to Mariners (in relation to WHL controlled works) are to be validated and issued by WHL.***
Content Guidance	***FORM-M003 Maritime Safety Information (MSI)*** will be used by WHL to field MSI from Operators. All notices should cover the risks posed by the operation highlighting the following where relevant: 1) Geographic co-ordinates and chart of site and infrastructure 2) Safe clearances and safety notes for mariners and other site users 3) Outline programme of works 4) Summary project description (*including details of all navigation safety features that relate*) 5) Vessel details 6) Operator contact details ***Notes:*** • ***All positions must be quoted in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes*** • Pictures or drawings of vessels and equipment should be attached in support • For long running projects, the maximum notice validity is one year before review and re-issue is required • **Useful reference:** *'RUK Safety Circular Issue 1:2013 – Notices to Mariners'* which can be found at http://www.renewableuk.com/

Notification and Recipients	• **Notices to Mariners shall be issued before commencement and after completion of any notifiable activity** • After issue by email, all notices will be posted at: https://www.wavehub.co.uk/notice-to-mariners • Where issued, Radio Navigation Warnings are also posted by the UKHO at: www.ukho.gov.uk • The notification of upcoming work is to be issued where possible two weeks (*minimum one week*) ahead of the commencement of operations (*mobilisation to site*). • Mid-works or project notifications (*details of important changes*) should be issued where possible one week (*minimum two days*) ahead of the relevant operations commencing. • The completion of operations notification (*including as-built / as-left details*) should be issued where possible one week *(maximum two weeks*) after of conclusion of the works (*demobilisation from site*). • For contacts and recommended recipients please refer to ***FORM-M019 Notice to Mariner Contact Schedule – LIVE*** which is updated continuously by WHL and validated on each issue of a Notice to Mariners (***WHL use only***).
Vessels Restricted in their Ability to Manoeuvre	As defined in the International regulations for preventing collisions at sea (1972), the term 'vessels restricted in their ability to manoeuvre' and the special status applying to these vessels shall include but not be limited to: 1) A vessel engaged in laying, servicing or picking up a navigation mark, submarine cable or pipeline 2) A vessel engaged in dredging, surveying or underwater operations 3) A vessel engaged in a towing operation such as severely restricts the towing vessel and her tow in their ability to deviate from their course.

MCA Guidance: MGN375 Maritime Safety Information
UKHO Notices to Mariners: www.ukho.gov.uk

Marine Operations Requirement (WAVE HUB-OMS-MOR-013)

Offshore Contractor Operations Management

These requirements apply to any operation on the Wave Hub offshore site contracted either by WHL (at any time) or by a Developer (prior to implementing a Developer Permit to Operate).

Task	Requirements
Contractor Marine Operations Planning	The documents to be submitted by an offshore Contractor must be project specific and as a minimum will include: • **FORM-M001 Contractor HSEQ Questionnaire** and supporting evidences • **Detailed Method Statement** (MOR003,011,014,023,024 may also relate) • **Risk Assessment** • **Emergency Response Procedures** (ERPs) and designated onshore and offshore duty contacts • **Vessel Certification and Compliance** (MORs 004,005,006 may also relate) • Valid **Insurances** as specified in the Contract • **FORM-M003 Maritime Safety Information** to inform a Notice to Mariners (pre-and post-works – MOR012) ***WHL must validate this documentation prior to issuing a Permit to Operate (Form M015). The safety management and permitting process is detailed in MOR017.*** ***The level of detail of the documentation should be commensurate with the scale of the project.*** *The Contractor is to thoroughly plan the work and then execute it in accordance with the accepted plans. In all cases the Contractor must provide fit for purpose vessel(s) and equipment operated by competent and experienced personnel with appropriate supervision.* **Risk Assessment** The duty holder should manage risks by the application of the principles of prevention. Where possible risk should be eliminated. Where risks cannot be eliminated, they should be reduced to the lowest extent possible, and residual risk should be managed with collective measures being provided before resorting to personal protective equipment. Risk Assessment must be an integral part of the project at all stages from design and planning through to completion. It is expected that the hazard log clearly shows the relationship between the identified hazard, the causal factors and the risk control measures and/or contingency. A Hazard Identification and Risk Assessment (**HIRA**) or a Hazard and Operability Study (**HAZOP**) workshop should be held prior to finalising works plans. The risk identification process will be detailed, site and project specific. Persons participating in the risk assessment process must be competent and experienced in the area being considered. *All risks should be reduced to 'as low as reasonably practicable' (ALARP).*

Contractor Marine Operations Planning (*Continued*)	**Method Statements** The Contractor must provide a detailed method statement that meets all relevant WHL and legal requirements and industry best practice. This should provide a detailed and coherent account of how the works are to be completed and the resources and methods to be used. The method statement should where relevant consider the following: • Scope of Work • Project Structure • Key Personnel Competency Requirements or Qualification Matrix • Roles & Responsibilities • Communications Plan and Key Contacts • Works Acceptance Criteria • Change Management Provision • Programme of Works, Milestones, Hold Points • Project Engineering and Plans • Vessel, Equipment and Sub-Contractor Selection • Met-ocean Limits, Positioning Tolerance, Safety Clearance • Vessel Checks and Acceptance Criteria • Equipment Lists, Specifications and Certification • Works Methodology Story Board • Contingency Plans and Equipment • Environmental Protection and Controls ***The RAMS and ERPs will be validated by WHL to ensure that the techniques proposed***: o Conform to Wave Hub MORs o Have sufficient **redundancy and contingency to deal with unexpected faults or deviations from the plans** **General** The works must be planned and executed in accordance with any Marine Licence conditions that apply. The Client is responsible (unless formally agreed otherwise) for obtaining any necessary **consents** from statutory bodies in relation to the works and sharing the relevant conditions with the Contractor. Client always to provide (and Contractor to consider) all **operationally relevant infrastructure and site safety information** with the works specification. (*Generally facilitated through access to the Contractors area of the WHL Box file share system*). Contractor to ensure all **live Notice to Mariners** are considered: https://www.wavehub.co.uk/notice-to-mariners

Contractor Communications	• **Offshore site access** is subject always to WHL permit conditions, access through any transit gates and within boundaries specified, and access communication and cooperation protocols being followed (***MOR-008 / MOR-009***). The Contractor is expected to notify, co-ordinate and co-operate with all other WHL permitted site users. This is facilitated by WHL through use of the Wave Hub **Operations Planning and Access Notification System (OPANS)** which all Contractors must subscribe to and keep up to date. OPANS conflict notifications must prompt Operator **co-operative works planning** to mitigate programme and working area clashes requiring further **SIMOPs** controls. • **Accidents, incidents, near misses and non-conformances** shall all be reported to WHL promptly using the Contractor's own safety management forms. **The Wave Hub Duty Manager must be informed of accidents or incidents immediately by the Contractor's Onshore Duty Manager by phone and copied-in on detailed accident/incident reports within 24Hrs**. If insufficient, the Wave Hub Duty Manager may request that *FORM-M007 Accident-Incident Report* is completed. Where a non-conformance is raised against the activities of a Contractor, WHL may request that *FORM-M009 Non-conformance and Hazard Report* (or an acceptable equivalent) is completed and that the corrective actions agreed are implemented and verified before further related activities can proceed. In safety critical instances, the ***Contractor Permit to Operate (FORM-M015)*** may be suspended. • **Variations** must be formally agreed with the Client according to contract terms (for WHL contracts: ***FORM-M005 Contract Variation Forms***). WHL must also be consulted and the ***Contractor Permit to Operate (FORM M015)*** adjusted before works may proceed on a varied scope. • **Weather Forecasts** shall be compiled and disseminated as agreed in the contract and as appropriate to the work. • Contractor **toolbox talks** to take place daily or prior to any new operations commencing (records must be maintained). • **Daily progress reports (*FORM-M006*** or a Contractor's accepted equivalent) should (where applicable to the Contract) be distributed contemporaneously to agreed recipients by email and shall always include: ***Wave Hub Duty Manager:*** duty.manager@wavehub.co.uk WHL Head of Operations: julius.besterman@wavehub.co.uk • All MMO **Marine Licence notification and reporting conditions** must be satisfied. • **Post works reports, assessments and processed data** shall be shared with WHL as stipulated in the contract (and in accordance with the requirements of *MOR-001/003* where these apply) and always within 4 weeks of completion. • A Contractor **operations and safety debrief** shall be held within 4 weeks of completion to review the outcomes and identify lessons learnt. ***All positions to be quoted to WHL in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes.***

Marine Operations Requirement (WAVE HUB-OMS-MOR-014)

WHL Personnel Access Offshore – WHL Internal Use Only

Task	Requirements
Training and Qualifications	• Identify personnel who will be attending vessel and establish the minimum **core competencies**: o **Personal Survival Techniques** Training (STCW95 MCA Approved) o ENG1 or ML5 **Seafarer Medical** (in date) o Alternatively **Visitor Exemption** requirements should be applied as detailed in the ***Offshore Visitor Form-M011*** • All visitors should complete the ***Offshore Visitor Form-M011*** as this records emergency contact details for all external personnel attending (*excludes contracted vessel crew/skipper*). • It is important to assess the person's expertise, experience and training on board marine craft as these factors have a significant impact on the overall level of risk associated with that person going offshore. • **Note that larger vessels may also have boarding requirements that preclude unqualified visitor access – *check first***.
Task Preparation	• WHL Head of Operations shall check that all relevant Permit requirements (***FORM M015 Contractor Permit to Operate***) are satisfied including ensuring that the vessel is fit for purpose and compliant with ***MOR-004***. • Establish tasks to be undertaken. Check and ensure that task **RAMS** (***FORM-M013 RAMS Template***) have been completed by a competent person and that residual risks after controls are ALARP. • The variety of vessels which may need to be boarded could extend from small work boats used for inspection / survey up to large offshore multipurpose construction vessels. The risks will be largely dependent on the type of vessel involved and the nature of the task. Items that need to be considered include, but are not limited to: o **Access Arrangements**: Larger vessels may be boarded by gangway / accommodation ladder. Smaller vessels may need to be accessed via quay ladders/ pontoons/ quay steps. Vessels already on site may need to be accessed by boat transfer. All have very different levels of risk and risk control. o **Exposure to Elements**: It is important to assess what sort of exposure to the elements the personnel may be required to endure whilst undertaking the work. As an example, monitoring operations from the bridge of a large construction vessel has a very different risk level to conducting visual inspections of navigation marks from a RHIB. o **Lifting Operations**: If personnel are visiting a vessel where lifting operations are being conducted, then the issues of safety zones and additional PPE must be considered.

Example offshore PPE that may be applicable to many offshore tasks are listed here for consideration *(the list should not however be considered exhaustive)*	• Suitable Life Jacket (*Minimum spec: SOLAS/MED approved 275N gas auto or manual, dual bladder, crutch strap and light. A spray hood is also preferential but not mandatory.*) • High-visibility, thermally protective, wet weather clothing (*as appropriate to the work, vessel and weather*) • Immersion suit (*SOLAS/MED approved - for working near water <12°C or working near water after dark*) • Appropriate waterproof safety footwear (*with toe protection*) • Eye protection (*protection against spray, task specific protection, and from glare on sunny days*) • Safety helmet and high visibility vest (*if offshore lifting operations are being conducted – chinstrap essential*) • Safety lines (*consider for transfers and small vessel transits*) • Ear protection (*from both noise and also from wind/rain if exposed for long periods*) • Gloves (*protection against weather conditions, task specific protection, and from guano*) • Portable VHF (*general operational communications and emergency use – qualified users only*) • Personal Locator Beacon (PLB) with internal GPS (*emergency use only*) • Sun cream and hat (*where exposed to the elements in the summer months to prevent sunstroke*) • Where several items of PPE are required these items need to be compatible with each other. • Take care not to over-protect – there should be a balance between protection and awareness/mobility. • PPE selected for an offshore task should be fit for purpose, regularly serviced (according to manufacture specifications) and inspected by a competent person before each use. • Provisions on small vessels - always take plenty of water and high energy snacks, and if cold, take a hot drink in a thermos.
Roles and Responsibilities	• The WHL Head of Operations shall ensure notification of the operation (***MOR-009***) check that appropriate escorts are allocated to unqualified visitors (***Form-M011***), **PPE** identified in the **RAMS** (***FORM-M013***) is suitable and made available to all personnel, and ensure a pre-mobilisation safety briefing is completed by a competent person (***Form-M012***). • The vessel Master must deliver a **Vessel Safety Induction**, adhere to WHL Permit to Operate conditions (***Form-M015***), relevant Marine Operations Requirement (***MOR-008***) and take command in the event of emergency on board (***MOR-020***). • The ***Wave Hub Duty Manager*** shall be swapped to a staff member ashore if the duty manager is to attend the vessel. • All personnel must : o Read and understand **RAMS** (***FORM-M013 RAMS Template***). o Attend and sign a **Toolbox Talk** (***FORM-M012 Toolbox Talk***) including the vessel master's **Vessel Safety Induction** o Wear and look after the **specified PPE** as instructed o At all times **follow the instructions issued by the Vessel Master** • **Accidents, incidents**, **near misses and non-conformances** shall all be reported: *FORM-M007 and/or FORM-M009.* The Wave Hub Duty Manager must be informed immediately and detailed reports completed and sent to the Duty Manager within 24Hrs.

Marine Operations Requirement (WAVE HUB-OMS-MOR-015)

Working with Research Organisations

Applies to research activity on or nearby the Wave Hub offshore site. (*This MOR does not apply to the installation of research equipment within the Wave Hub offshore development area where the Research Organisation shall be permitted as a Developer using Form-M014.*)

Task	Requests
Working with Research Organisations	Research activity covers offshore information gathering operations carried out by academic or research organisations. Activities can include, but are not limited to: • Deployment of buoys to establish wave data • Deployment of buoys to establish current data • Deployment of sea bed devices to measure water column current velocities, noise, benthic, cetacean or fish data • Seabed sampling and ROV surveys • Hydrographic and other vessel mounted or towed instrumentation surveys • Surface wildlife monitoring *Where equipment is to be installed within the Wave Hub offshore development area, WHL first requires that a commercial agreement, a seabed lease and marine licence (or exemption), financial security and insurances are put in place as appropriate and commensurate to the project. In this case, prior to deployment, following all relevant validation, a Wave Hub Permit to Operate must be issued.* Generally, seabed research activity is nearby but outside the Wave Hub offshore site or vessel based and transient / passing through. The research organisation planning proximate work must consider all designated boundaries, infrastructure and activity on site to ensure that the research activity can be planned and executed safely. Registered and active research organisations are included on all Notice to Mariners issued by WHL. *Please contact the WHL Head of Operations to add or amend the Notice to Mariners contact schedule.*

Working with Research Organisations *(continued)*	It is requested (*and will where possible be agreed through a Memorandum of Understanding with each Research Organisation*) that nearby or passing-through research projects consider safety with respect to Wave Hub during planning and management of operations by adhering to the following recommendations: • Vessels shall have AIS installed and working when working near or accessing the Wave Hub offshore site (*WHL can then monitor operations and proximity and assist where required*). • Research operations shall consider all risks relating to operating near the Wave Hub offshore site and safety clearances in force through review of all WHL Live Notices to Mariners: http://www.wavehub.co.uk/notice-to-mariners • When planning research activity, the research project manager must liaise with the WHL Head of Operations or Duty Manager throughout to ascertain whether any concurrent Developer or WHL Contractor operations may conflict with the research plans. Where a conflict arises, the research project manager must seek to mitigate programme and working area clashes through co-operative works planning and robust communications throughout with the Developer or Contractor project manager concerned (*contact details will be provided*). • Research activity shall maintain the following minimum safety clearances: o 100m from Developer red-line leasehold areas (*unless access is authorised by the Developer*) o 250m from all Wave Hub Aids to Navigation (*mooring swing zone*) o Exclusion always from charted Safety Zones (*legal requirement*) o 250m Safety Clearance from installed live 33kV Subsea Power Cables (*where any seabed or near seabed activity is planned*) o Clearance as notified from any WHL Contractor or Developer operation o Clearance (if varied) as advised by vessel masters on site engaged on Contractor or Developer operations. • The research vessel shall where necessary, communicate on and monitor an agreed marine VHF operations channel to ensure continued safe working alongside any nearby WHL Contractor or Developer vessel activity. • The research organisation shall endeavour to give reasonable notice of the planned research activity to the WHL Head of Operations (at least two weeks in advance of the works if possible) to allow sufficient time to undertake safety assessment and co-operative planning. • All offshore research activity shall be considerate to third party mariners and in particular the local fishermen. • The research organisation and any vessel utilised must carry adequate protection and indemnity (or third-party liability) insurance to protect WHL or Developers from any damage caused (*minimum £5m cover recommended*).

Working with Research Organisations *(continued)*	• The works shall always be properly planned and risk assessed by a competent person and robust ERPs developed. The works should be undertaken only by qualified and competent operators with appropriate vessels, equipment and supervision. • In the event of an emergency, the research organisation must implement the appropriate ERP. The Wave Hub Duty Manager should be informed by phone (particularly if Wave Hub infrastructure or operations are threatened). The Wave Hub Duty Manager function is to provide additional communications support or monitoring and disseminate safety information to WHL Contractors and Developers where necessary. Where critical to safety the Duty Manager may shut down the system. The Wave Hub Duty Manager should be kept informed throughout an emergency response by the research organisation's Onshore Duty Manager but is not to be considered a duty holder under the research organisation's ERP. • If you suspect you have snagged a renewable energy structure, mooring or associated subsea power cable, DO NOT endanger your vessel and crew by attempting to recover your gear. Carefully plot your vessel's position as accurately as possible and advise the CGOC and Wave Hub Duty Manager. • Prior to commencing operations, the research organisation should disseminate the following information to the Wave Hub Duty Manager and WHL Head of Operations by email: o Onshore Duty Manager contact details o Offshore Project Manager contact details o Vessel and Vessel Master contact details o Outline Programme of Works and Location Details *These limitations do not in any instance guarantee safe passage or waive the responsible mariner's legal safety duties under IMO conventions:* ***SOLAS, STCW, COLREGS, MARPOL****, and* ***SAR*** *as applied through the* ***UK MCA Maritime Regulations.*** ***All positions must be shared in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes.***

WHL Key Marine Safety Contacts:

Wave Hub Duty Manager *(Available 24/7)*	*Email:* duty.manager@wavehub.co.uk	***Duty Mobile*: 07818 573180**
WHL Head of Operations:	*Email*: julius.besterman@wavehub.co.uk	*Mobile*: 07918 630852

Safety Management at Wave Hub – Developer's Minimum Requirements and Interfaces with WHL

Legal Framework to which a developer has a duty to comply with in the development of an effective and appropriate safety management system includes:

- Health and Safety at Work Act 1974
- Merchant Shipping Act 1995
- Management of Health and Safety at Work Regulations 1999
- Construction (Design and Management) Regulations 2015
- The Electricity at Work Regulations 1989

WHL Minimum Requirements with which developer safety management systems must comply:

- the WHL **Operational Management System (OMS)** procedures and requirements
- the Wave Hub **Active Safety Management System (ASMS)** requirements
- the Offshore Wind and Marine Energy Safety Guidelines 2014 (published by Renewable UK) – an authoritative good practice guide and a minimum standard

Developer submits to WHL their **Safety Management System (SMS)** including:

- Project organogram and contact details
- Design, Navigation, Operability and Failure Mode Risk Assessments
- Detailed Emergency Response Plans (ERP)
- Clear risk management systems, processes and controls to ensure ALARP is achieved for all works and activities
- Safe systems of work and RAMS covering access/egress and key operation and maintenance activities
- Engineering drawings, system schematics and equipment specifications in support of procedures and RAMS
- Environment and pollution risk management systems and waste management plans

The Developer SMS should receive input, review and formal sign-off that the system meets legal and WHL requirements and follows good practice by both:

1) The Principal Engineer
2) An HSEQ Professional

Developer SMS must be fully reviewed at least annually and/or before any deployment by both the Principal Engineer and HSEQ Professional and passed to WHL

WHL Validation of Developer's Safety Management System:

- WHL minimum requirements met or exceeded
- Due process has been followed

The annual review of the Developer's SMS will also need to be validated by WHL.

WHL issues a 'Permit to Operate' for the duration of the deployment or works providing all requirements have been met.

- Permit to Operate allows operations in support of the agreed equipment for the specified duration
- Permit conditions and continued compliance with all referenced Commercial, Marine and Electrical requirements apply throughout
- All site users must co-operate in full, and if appropriate and safe to do so, assist in emergency intervention (**permit exempt**)

Note: Permit conditions may be varied at any time by WHL.

Developer –Non-routine and Higher-risk Operations

Major, complex or higher risk offshore works requiring greater levels of safety clearance and inter-operator co-operation will always require advanced notification and in most cases further control through application of a Permit for Special Operations – PSO (and always where Wave Hub infrastructure is affected).

*Permit applications should be made as specified on the Permit for Special Operations (**Form M016**) unless exempted by WHL. Typically, Device Deployment, Major Device Maintenance or Alteration, Diving Operations and Device Decommissioning will require a PSO.*

WHL to **check** that the supporting information to a Permit for Special Operations application:

- Meets WHL minimum requirements
- Follows due process

WHL issues an operation specific 'Permit for Special Operations'

Notice to Mariners to be issued by WHL in advance of the works according to ***MOR-012***.

Note: Permits may be withdrawn in response to non-conformance.

Developer - Routine and Minor Operation and Maintenance Activities.

Routine or minor works within permitted working areas, using agreed access arrangements, with validated vessel(s), within the scope of the validated O&M plans and any additional operational RAMS later endorsed as routine on the Permit to Operate.

Developer - Emergency Access

Any critical access essential to safeguard personnel and maintain safe operating conditions across the site. Emergency operations must adhere to:

1. Validated ERPs and ERCoP, **or**
2. Validated emergency engineering access processes and controls defined in the Developer's SMS

All other permitted site users must co-operate in full, and if appropriate and safe to do so, assist in emergency intervention whilst on site.

Developer Onshore Duty Manager alerts Wave Hub Duty Manager as soon as it is safe to do so by phone (see ***MOR-010***).

The Developer shall in all cases submit an Accident / Incident Report (**Form M007** - or acceptable Developer equivalent) within 24 hours.

Corrective actions shall be agreed with WHL and recorded using the Non-conformance / Hazard Report (**Form M009**).

For all planned operations, the Developer must notify, engage and work collectively with WHL and all other permitted site operators in advance as set out in the Offshore Site Safety (*MOR-008*) and Offshore Site Access (*MOR-009*) requirements.

The Wave Hub Duty Manager must be kept up to date through ***OPANS*** or ***Form-M010*** to facilitate effective liaison with the Coastguard under the Wave Hub ERCoP in the event of an emergency.

Note: Access is not guaranteed under any permit and is subject always to working to WHL Marine Site Safety controls and co-operating throughout with all other permitted operators

WHL Safety Monitoring

WHL will monitor OPANS and AIS systems and may spot check operational task RAMS to ensure safe working:

- Have the key ALARP processes and controls been adopted?
- Are task RAMS generated by a competent person to the appropriate detail?
- Are WHL minimum requirements being realised?

KEY

Legal Obligations & WHL Minimum Requirements

WHL Input & Controls

Developer Input

Offshore Safety Management at Wave Hub – Contractor's Minimum Requirements and Interfaces with WHL

The **Legal Framework** to which the Contractor's safety management system must comply includes:

- Health and Safety at Work Act 1974
- Management of Health and Safety at Work Regulations 1999
- Merchant Shipping Act 1995

And where applicable:

- Construction (Design and Management) Regulations 2007
- The Electricity at Work Regulations 1989

WHL Minimum Requirements with which the Contractor's operation specific safety management arrangements must comply:

- the WHL **Operational Management System (OMS) –** all relevant procedures and requirements will be provided to the Contractor by WHL
- the Offshore Wind and Marine Energy Safety Guidelines 2014 (published by Renewable UK) – an authoritative good practice guide and a minimum standard (*where applicable*)

Contractor submits to WHL evidence of effective and appropriate **Safety Management Systems** that meet these requirements including:

- **QHSE Policies and Certifications,** Incident History, Project Structure, Key Staff & Qualifications, Relevant Company Experience and References. This information is collected through ***FORM-M001 Contractor HSEQ Questionnaire***.
- Provision of project specific Emergency Response Plans (**ERPs**).
- Provision of detailed procedures and risk assessments specific to the works (**RAMS – see also *MOR-013-Offshore Contractor Operations Management***)
- Holding a detailed planning workshop including hazard identification and risk assessment (**HIRA**) before commencing operations offshore

WHL Validation of Contractor's Project Safety Management arrangements:

- WHL Minimum Requirements met or exceeded
- Due process has been followed

The Project Safety Management arrangements must be **reviewed annually** by the Contractor. The review will be validated by WHL under long running contracts.

WHL issues a 'Permit to Operate' for the duration of the contracted works providing all requirements have been met.

- Permit to Operate allows the contracted operations to proceed for the specified duration in the specified locations
- Permit conditions and continued compliance with all referenced Commercial, Marine and Electrical requirements apply throughout
- All site users must co-operate in full, and if appropriate and safe to do so, assist in emergency intervention (**permit exempt**)

Note: Permits may be withdrawn or the conditions varied at any time by WHL.

WHL issues a Notice to Mariners (*see **MOR-012***)

Contractor Requires a Variation to the Contract & Permit to Operate

Any operation that varies from the contracted scope of works **and** permit conditions established

Contractor submits a Variation application: ***FORM-M005 Contract Variation Forms***

Contracted Operations

Works within permitted working areas, using agreed access arrangements, with validated vessel(s) / equipment / personnel, and in accordance with the agreed RAMS and scope of work

Contractor Reactive or Emergency Access

Any critical access essential to safeguard personnel and maintain safe operating conditions across the site. Emergency operations must adhere to:

1. Working to a filed ERP **or**
2. Working to emergency engineering or vessel processes and controls defined in the Contractor's SMS

All other permitted site users must co-operate in full, and if appropriate and safe to do so, assist in emergency intervention whilst on site.

Contractor Onshore Duty Manager alerts Wave Hub Duty Manager as soon as it is safe to do so by phone.

The Contractor shall in all cases submit an Accident / Incident Report (*Form M007 - or acceptable Contractor equivalent*) within 24 hours.

Corrective actions shall be agreed with WHL and recorded using the Non-conformance / Hazard Report (**Form M009**).

WHL to **check** that the supporting information to the Contract Variation application:

- Meets WHL minimum requirements
- Follows due process

WHL approves the Contract Variation and issues an updated 'Permit to Operate' noting the Variation agreed

*A further Notice to Mariners may be issued by WHL according to **MOR-012**.*

For all planned operations, the Contractor must notify and engage with WHL and all other permitted site operators in advance as set out in the Offshore Site Safety (*MOR-008*) and Offshore Site Access (*MOR-009*) requirements.

The Wave Hub Duty Manager must be kept up to date through ***OPANS*** or ***Form-M010*** to facilitate effective liaison with the Coastguard under the Wave Hub ERCoP in the event of an emergency.

Note: Access is not guaranteed under any permit and is subject always to working to WHL Marine Site Safety controls and co-operating throughout with all other permitted operators

WHL Safety Monitoring

WHL will monitor OPANS and AIS systems and may make spot checks during operations to ensure safe working in accordance with accepted RAMS, and check that Permit conditions and WHL minimum requirements are being realised.

Contractor ***Daily Progress Reports*** must be distributed to WHL by email.

During ***Wave Hub Cable Handling*** works, a berth on board must be made available for an attending WHL representative.

KEY

- ***Legal Obligations & WHL Minimum Requirements***
- ***WHL Input & Controls***
- ***Contractor Input***

Wave Hub

Offshore Site Safety
WHL Management Process
WHL Internal Use Only

Review and comment on task RAMS (*MOR-001/013*):
1) Detailed and generated by a competent person
2) Reduce risks to ALARP
3) Meet all WHL minimum requirements
4) Safeguard the Wave Hub Asset
5) Detailed engineering assessment and plans
6) Minimise impacts on other site operators
7) Include detailed and appropriate ERPs and contingent operation plans and equipment
8) HIRA completed

Validation of SMS (*MOR-016/017*) **and Equipment TPV** (*MOR-002*)

Vessel and *if applicable* Cable Handling Equipment Compliance Checks / Audits (*MOR-003/004/005/006*)

WHL validation of all required Permit Compliance Documentation and Agreement on Residual Conditions

Issue: Permit to Operate / Permit for Special Operations / Permit Variation (*Form-M014/015/016/005, subject to Marine Licence Conditions*)

Administration at Issue of Permit:
- **Where required issue Notice to Mariners (*MOR-012, Form-M003*)**
- Update Live Permit Log (*Form-M004*)
- Add PTO to OPANS (*if applicable*)
- Update AIS System and Vessel Groups
- **Update and Issue the Wave Hub ERCoP where required**

Permit for Special Operations or Permit Variation Required

Ensure Operator Adds <u>Operation</u> to OPANS in Advance (*MOR-008/009*)

Operations Commence – Operator Adds OPANS <u>Access Notifications</u> (*MOR-009, Form-M010 if OPANS unavailable*)

Wave Hub Duty Manager – Emergency Response Communications Function

Duty Manager Emergency Response Plans:
- *MOR-020*
- *Wave Hub ERCoP*
- *SCOUT*

In-Progress Operational Safety Management / Monitoring:
- WHL Representative on board installation vessel during handling of Wave Hub Cable
- Review of DPRs (*Form-M006 or equivalent*) and Access Reports (OPANS or *Form-M010*)
- Accident or Incident Reporting / Non-conformance and Hazard Reporting including Investigation / Corrective / Preventive Action Management (*MOR-007/013/019, Form-M007/M009*)
- Safety Monitoring (*MOR-016/017*) including:
  - OPANS/AIS/VHF – for checking safe working and co-operation (*MOR-008*)
  - SIMOPs Communication Plans where required (*Form-M002*)
  - RAMS / Toolbox Talk Checks
- Annual permit review and documentation refresh
- Emergency response exercises annually with Developers
- **Issue of Notice to Mariners (*MOR-012*) for any critical safety notification**

Operations Concluded – Operator Reports 100% Complete and Closes Operation on OPANS (*MOR-009, Form-M010 if OPANS unavailable*)

Review/Validate Reportable Information (*MOR-001/003/013/023, Marine Licence Requirements*)

Permit Closed (*Form-M014/015/016*):
- Update Live Permit Log (*Form M004*)
- Close PTO on OPANS (*if applicable*)
- Update AIS System and Vessel Groups
- **Where required issue Notice to Mariners (*MOR-012, Form-M003*)**
- **Update and Issue the Wave Hub ERCoP where required**

Marine Operations Requirement (WAVE HUB-OMS-MOR-019)

Reportable Incidents and Accidents

Requirement	Details

Regulations and Authority Notification

Authority	Regulation and Jurisdiction
Maritime and Coastguard Agency (MCA)	The MCA enforces (through vessel inspection) the UK Merchant Shipping Act 1995 and associated regulations, which cover all aspects of vessel safety in UK waters. The MCA has extensive powers in law to prosecute breach of Maritime Health and Safety Regulations. The licence holder must report any material within the legal definition of "wreck" recovered during any works, to the MCA Receiver of Wreck as required by law under the Merchant Shipping Act 1995.
Marine Accident Investigation Branch (MAIB) [Part of the Department for Transport (DfT)]	The MAIB is empowered through the UK Merchant Shipping Act 1995 to investigate reportable accidents or incidents involving ships and their crews in UK waters.
Health and Safety Executive (HSE)	The HSE enforces (through work site inspection) the UK Health and Safety at Work Act 1974 (HSWA) and subsidiary regulations, which apply to all work sites within the UK Renewable Energy Zone (REZ). The HSE has extensive powers in law to prosecute breaches of the Health and Safety Regulations. The HSE Reporting of Diseases and Dangerous Occurrences Regulations (**RIDDOR**) 2013 empowers the HSE also to investigate reportable incidents or accidents at all work sites including on board renewable energy devices, other floating offshore infrastructure, docks and construction works on or from a ship. The HSE Electricity (Safety, Quality and Continuity) Regulations 2002 additionally requires that 'specified events' associated with subsea cables are reported.
The Police	The Police have overall jurisdiction where any fatality or life-threatening injury occurs, in addition to those authorities above as applicable (***all relevant authorities must be contacted by phone asap in the event of fatality***). The scene of a fatality must not be interfered with, other than to make the area safe – it may be treated as a crime scene and interference is an offence.
Trinity House Lighthouse Authority (TH)	Aids to Navigation faults must be reported to TH as the General Lighthouse Authority with statutory powers to inspect, regulate and enforce availability of Aids to Navigation for the safety of all seafarers.

Regulations and Authority Notification *(continued)*

Authority	Regulation and Jurisdiction
United Kingdom Hydrographic Office (UKHO)	Responsible for the maintenance of maritime charts and issue of critical safety alerts. Urgent updates are issued as Radio Navigation Warnings (chargeable to the responsible party) or chart-updating Notice to Mariners. Device or buoy adrift incidents (and events that pose dangers to seafarers) must be reported to the UKHO as well as any other information set out in the Marine Licence concerned.
Marine Management Organisation (MMO) [sponsored by DEFRA]	The MMO licences, regulates and enforces marine activities to the conditions set out. Marine Pollution incidents must be immediately reported to the MMO Marine Pollution Response Team. Prompt reporting and recording of archaeological remains encountered, or suspected, during all phases of construction, operation and decommissioning as set out in the Wave Hub WSI and in accordance with The Crown Estate Protocol for Archaeological Discoveries Offshore Renewable Projects. Any other reportable incidents or information as set out in Marine Licence conditions.

A competent person from the responsible Operator must complete the relevant forms and forward them to the appropriate authorities as soon as possible and within the regulation deadlines. The authorities will decide whether they wish to visit the site of a serious incident, during which time it shall be left untouched, other than for essential security and / or safety reasons.

The WHL H&S Advisor will advise and assist in the necessary authority notifications and form completion for WHL accidents and incidents offshore. If in doubt, report offshore incidents to both the MAIB and HSE.

Useful Reference: *MCA/MAIB/HSE Offshore Enforcement MoU - http://www.hse.gov.uk/aboutus/howwework/framework/mou/mcamou.pdf*

In all cases where an incident or accident is reportable, an internal investigation shall be completed by the Operator concerned and corrective actions agreed with WHL (FORM-M009 Non-conformance and Hazard Report may be used to record corrective actions agreed).

Useful Reference: *HSE HSG245 – Investigating Incidents and Accidents - http://www.hse.gov.uk/pubns/hsg245.pdf*

Trinity House

Trinity House as the General Lighthouse Authority (GLA) has a statutory duty to monitor the provision and maintenance of **Aids to Navigation (AtoN)** around the coast of England and Wales. Under powers granted to Trinity House as the GLA in the Merchant Shipping Act 1995, it is required that all operators of charted aids to navigation must report casualties / failures of AtoN for which they are responsible. **Trinity House as the system administrator also has the ability to enter Casualties / Failures against any AtoN after periodic inspection by a navigation directorate officer.**

Wave Hub AtoN faults shall be reported by WHL as soon as failures are confirmed, online at: https://panar.thls.org/atonreporting/

A user guide is available to download at this site and this should be read carefully before submitting a fault report (U/N & P/W = 'WaveHub').

MAIB	**The Marine Accident Investigation Branch.** An applicable hazardous incident at sea should be reported to MAIB by the quickest means possible. The MAIB has a dedicated reporting line for this purpose: **023 8023 2527** from within the UK. This line is manned 24 hours a day. A verbal report should be followed up by completing the report form available on the UK Government MAIB website as soon as possible: https://www.gov.uk/government/publications/report-a-marine-accident and then emailing this to: maib@dft.gsi.gov.uk **N.B. The vessel Operator concerned must make the report to MAIB. The Wave Hub Duty Manager shall verify this is done.** The reporting duties of all seafarers and vessel owners under the requirements of the new Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 can be found at: https://www.gov.uk/government/publications/mgn-458-accident-reporting-and-investigation **In summary:** Accidents involving or occurring on board any United Kingdom vessel or any vessel within UK waters must be reported to the MAIB under the Regulations, except for accidents involving or occurring on board a pleasure vessel. A reportable marine casualty is an event or sequence of events that has resulted in any of the following and has occurred directly by or in connection with the operation of a ship: (i) the death of, or serious injury to, a person; (ii) the loss of a person from a ship; (iii) the loss, presumed loss or abandonment of a ship; (iv) material damage to a ship; (v) the stranding or disabling of a ship, or the involvement of a ship in a collision; (vi) material damage to marine infrastructure external of a ship, that could seriously endanger the safety of the ship, another ship or any individual, or (vii) pollution, or the potential for such pollution to the environment caused by damage to a ship or ships. 'Near misses' are marine incidents and are reportable where if not corrected the situation would endanger the safety of a ship, its occupants or any other person or the environment. Accidents involving commercial divers whilst diving are not covered by these regulations and should not be reported to the MAIB. However commercial diving incidents are covered under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995 and should be reported to the Health and Safety Executive.

HSE RIDDOR 2013	**HSE RIDDOR - Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013** RIDDOR 2013 only requires you to report accidents if they happen 'out of or in connection with work'. Only 'responsible persons' including employers, the self-employed and people in control of work premises should submit reports under RIDDOR. In every applicable case, the responsible person must notify the HSE without delay, this is most easily done by reporting online at http://www.hse.gov.uk/riddor/report.htm A telephone service is also provided for immediate reporting of fatal and specified injuries - call the Incident Contact Centre on 0345 300 9923 (opening hours Monday to Friday 8.30 am to 5 pm). *A full report must in every case be submitted to the HSE within 10 days of the incident.* **N.B. Operators must make the report to the HSE for accidents and incidents on infrastructure and during works for which they are responsible (for any incident on or in connection with an OREI then the Developer is responsible). The Wave Hub Duty Manager shall verify this is done. In such instances, the HSE Renewable Energy Team should also be notified: Email: trevor.johnson@hse.gsi.gov.uk (Manager) and steve.area11.lewis@hse.gsi.gov.uk (Inspector) Tel: 02920 263065 Mobile: 07798 882094.** Reportable incidents include: • accidents resulting in the death of any person • accidents resulting in specified injuries to workers • injuries to workers which result in their incapacitation for more than 7 days • non-fatal accidents requiring hospital treatment to non-workers and • dangerous occurrences Full details of reportable incidents under each of these categories can be found at: http://www.hse.gov.uk/riddor/reportable-incidents.htm ***Useful reference:*** HSE INDG453 – Reporting Accidents and Incidents at Work: http://www.hse.gov.uk/pubns/indg453.pdf
HSE **RIDDOR 2013 Schedule 2 Reporting Guidance Notes – Commercial Diving**	**HSE RIDDOR - Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013** If a commercial diving incident involves any of the following then the HSE must be notified through RIDDOR: • The failure, damaging or endangering of- o any life support equipment, including control panels, hoses and breathing apparatus; or o the dive platform, or any failure of the dive platform to remain on station -which causes a significant risk of personal injury to a diver. • The failure or endangering of any lifting equipment associated with a diving operation. • The trapping of a diver. • Any explosion in the vicinity of a diver. • Any uncontrolled ascent or any omitted decompression which causes a significant risk of personal injury to a diver. Specialist advice is available from HSE Diving Inspectors. See also: http://www.hse.gov.uk/riddor/dangerous-occurences.htm **N.B. The Dive Contractor responsible for the works must report the incident to the HSE. The Wave Hub Duty Manager shall verify this is done. In such instances, the HSE Energy Diving Team should also be notified [Email: nick.deppe@hse.gov.uk Tel: 02030 282734 Mobile: 07824 127789].**

WHL Marine Emergency Response Plan

WHL INTERNAL USE ONLY

Document Title	Date	Revision No	Issued By	Approved by	Page **1** of **3**
MOR-020 WHL Marine Emergency Response Plan	04-01-2018	21	JB	CG	

Wave Hub Aid to Navigation Emergency

- WHDM emergency validation: persistent AIS alarm (>2hours), or reliable visual report accompanied with position data
- If confident alarm is genuine (use Buoy Sentinel to validate for NC), commence communications log and inform CGOC.
- Inform UKHO where situation potentially threatens other sea users (*buoy adrift*)
- Inform WHMD and, if criminal damage suspected, the Police and MMO
- Inform TH DO and request soonest emergency intervention where appropriate
- Inform all other active ODMs (assistance may be offered) and add WHL Notification on OPANS
- Inform WHHO (who will issue NtoM, update PANAR and coordinate vessel intervention)
- Update CGOC regularly throughout (*status and position updates where buoy adrift*)
- Update and close out all communications and update/close WHL Notification on OPANS when situation safely resolved
- Submit completed Incident Report (Form M007) to WHMD and WHHO within 24hrs. WHHO to complete Form M009

Wave Hub Data Buoy Emergency

- WHDM to contact Fugro DM on receipt of persistent AIS alarm (>2hours)
- Fugro DM to validate alarm (Satellite and Radio monitoring available)
- Fugro DM to confirm status and position to WHDM. Where alarm validated, Fugro ERP to be implemented by Fugro DM
- WHDM to commence communications log and check CGOC has been informed (*flag ERCoP for full safety information*)
- WHDM to inform other ODMs where operations or infrastructure may be affected or at risk
- WHDM to inform WHMD and WHHO (WHHO will issue NtoM and coordinate Fugro emergency vessel intervention)
- Fugro DM to ensure CGOC and WHDM are regularly updated as situation and response develops
- Fugro DM to share details of the Recovery Plan with the WHDM, WHHO, CGOC and to Add Recovery Operation to OPANS
- WHDM to monitor situation and disseminate information from Fugro DM until recovery is complete
- On safe recovery, WHDM to ensure Fugro DM Closes Operation on OPANS and submits Incident Report within 24hours

Wave Hub Subsea Cable Emergency

- Where requested by CGOC or for serious Safety Risks posed by the LIVE Subsea Cable to any third party – SHUT DOWN
- WHDM to Shut Down System via SCADA following WHL Electrical SCOUT and commence action / communications log
- WHDM to confirm details/action taken with CGOC (*flag ERCoP for full safety information*), WHMD, and affected ODMs
- **Cable fouling: do not accept liability / advise against equipment recovery / obtain accurate location (*refer to CGOC*)**
- In the case of third party vessels, communicate through CGOC. In the case of Operations communicate with ODM
- WHDM to update CGOC regularly and assist authorities throughout
- Inform WHHO (who will issue NtoM if required/appropriate). WHDM to Add Notification to OPANS.
- Update affected ODMs as situation and response develops. WHHO and WHMD to instigate Contingency Plans
- Update and close out all communications and update/close WHL Notification on OPANS when situation safely resolved
- Submit completed Incident Report (Form M007) to WHMD and WHHO within 24hrs. WHHO to complete Form M009

Operator (Contractor or Developer) Emergency

- The ODM concerned must implement their applicable **ERP** and coordinate the critical response until safe resolution
- In all cases the ODM must ensure that the CGOC and WHDM are kept informed of all relevant detail throughout
- WHDM to commence communications log and check CGOC has been informed (*flagging ERCoP for safety information*)
- Where a threat to other sea users is posed (*device/vessel adrift*), the UKHO must also be informed by the ODM
- ODM to inform Police (*criminal damage or fatality*), MMO (*Marine Pollution*) or Receiver of Wrecks (*wreck discovery*)
- WHDM to shut down system if justified. WHDM to notify WHMD and WHHO (WHHO will issue NtoM if necessary)
- WHDM to notify other ODMs where operations or infrastructure may be affected or at risk (*e.g. system shut-down*)
- ODM to ensure details are promulgated to other affected ODMs. Any planned vessel response must be added to OPANS.
- WHDM to monitor situation and ensure ODM is communicating effectively to all parties involved (assisting as required)
- On resolution of critical response phase, ODM to update all parties involved & circulate an Incident Report within 24hrs

UXO (Beach, Floating or Seabed Offshore)

- Upon confirmed sighting / reliable report, WHDM to ensure CGOC has been informed (*flag ERCoP*)
- Keep well clear, record details and commence communications / actions log
- Inform active ODMs to ensure Operators steer clear. Assist where safe to do so in keeping area clear of third parties
- If cable at risk / in proximity to UXO, WHDM to Shut Down System via SCADA following WHL Electrical SCOUT
- If shut-down, WHDM to confirm action taken to CGOC and ODMs where devices have been unexpectedly isolated
- WHDM to inform WHMD and WHHO and Add Notification to OPANS
- WHDM to update CGOC regularly and assist authorities throughout
- Disseminate 'All Clear' to all ODMs, WHMD and WHHO when authorities advise safe to return
- Inform SSE and ensure restoration of power offshore (EOP-010) as soon as reasonably practicable
- On safe completion, WHDM to close Notification on OPANS and submit Incident Report (Form M007) within 24hrs

WHL Personnel Accident Offshore

- OIC to assess scene and take primary safety critical actions
- OIC to call CGOC for assistance (*flag ERCoP for full safety information*)
- OIC to take secondary control actions, ensure first aid is administered and inform the WHDM
- OIC to secure site and hand over to the emergency services on arrival
- WHDM to commence communications log and inform WHMD
- WHMD to inform NOK
- WHDM to inform any active or affected ODMs and Add Notification to OPANS (where appropriate)
- WHDM to monitor the situation and assist CGOC and OIC throughout
- Update and close out all communications and update/close WHL Notification on OPANS when situation safely resolved
- WHDM to ensure OIC submits Incident Report to WHMD and WHHO within 24hrs. WHHO to complete Form M009

Acronym Definitions:		
AIS: Ship Automatic Identification System	**NOK**: Next of Kin	**TH DO**: Trinity House Duty Operations
CGOC: Coastguard Operations Centre	**NtoM**: Notice to Mariners	SSE: SSE Contracting Limited – Wave Hub HV System Operators
ERCoP: Emergency Response Coordination Plan (WHL, Permitted Operators and MCA)	**ODM**: Operator (WHL Contractor or Developer) Duty Manager (Onshore)	**WHMD**: WHL Managing Director
ERP: Emergency response Plan	**OIC**: Operator Offshore Incident Command	**WHDM**: Wave Hub Duty Manager
Fugro DM: Fugro Duty Manager (Wave Data Contractor)	**OPANS**: The Wave Hub Operations Planning and Notification System	**WHHO**: WHL Head of Operations
MMO: Marine Management Organisation – Pollution Response	**SCADA**: Wave Hub Supervisory, Control and Data Acquisition System	**UKHO**: Radio Navigation Warnings
		UXO: Unexploded Ordnance

Emergency Communications:

Incident Summary		**Location (WGS84 Lat/Long)**	*(As accurately as possible)*
Injuries or Damage		**Hazards:**	
Date / Time occurred	/	**Weather Conditions**	
Date / Time reported	/	**Reported By / Alarm Source**	
Responsible Duty Manager		**Offshore Incident Command**	
Emergency Services Informed		**Emergency Services Attending**	
SCADA System Shut Down Required		**Time of System Shut-Down**	
Operations at Risk (Check OPANS)		**Infrastructure at Risk (Check AIS)**	
Device Tracking Information (ERCoP)			
Additional Contact Information			
Wave Hub Duty Manager Resources:	**OPANS Duty Manager Access:** www.wavehub.co.uk/portal/login Username: duty.manager@wavehub.co.uk Password: 24/7help! **AIS Asset-Monitor Read Only System Access:** www.asset-monitor.com/AssetMonitor.html Email: duty.manager@wavehub.co.uk Password: 24/7help!		

Date	Time	Contact	Communication Summary Notes

Incident Reporting: as soon as it is safe to do so, the responsible Operator must report the incident to the appropriate authorities and preserve the site where required – see MOR019.

WHL will always seek to restore safe operating conditions as soon as reasonably practicable: once the critical situation is controlled, the WHMD will facilitate an incident review and agree level of internal investigation and corrective actions with all parties concerned.

Media Enquiries: during or after an incident shall be forwarded to the WHMD.

ERP Implementation Responsibilities:

Asset or Operation	Onshore Duty Holder
Wave Hub Infrastructure	**Wave Hub Duty Manager (WHDM)**
Permitted Operations / Infrastructure	**Operator Duty Manager (ODM)**
SAR Response	***MCA Coastguard Operations Centre (CGOC)***
Asset or Operation	**Offshore Incident Command (OIC)**
Permitted Operations / Infrastructure	**Offshore Operations Manager**
Vessel	**Vessel Master**
Diving or ROV	**Dive or ROV Supervisor**

Proportional, appropriate and prompt response is expected from all permitted operators.

Communication Guidelines:

Emergency communications shall always be by phone. Only supporting information may be issued by email.

WHDM Emergency Information Collection	Protocols for Contacting the Emergency Services	OIC General Emergency Protocols
The WHDM should record as a minimum the following when an incident is reported: 1) Location (WGS84 Lat/Long) as accurately as possible 2) Time of incident / Time of report 3) Incident Summary (including details of Injuries / Damage) 4) Hazards & Weather Conditions 5) Assistance Required or Attending 6) Key Contact Details (if not contained herein)	When Contacting the Necessary Authorities: 1) Give Your Name and Contact Details 2) Provide all Details of the Incident Reported 3) Reference the Wave Hub ERCoP for the latest detailed Safety Information 4) Agree Actions to be Taken 5) Agree on Further Contact	If On-Scene and Acting as OIC, Apply the Following Emergency Protocol: 1) Assess Scene or Information 2) Take Primary Safety Critical Actions 3) Call Emergency Services for Assistance 4) Take Secondary Control Actions (ensure first aid is being administered) and Inform WHDM 5) Secure Site and Hand-Over to the Emergency Services or Emergency Response Contractor 6) Debrief, Reporting, Investigation and Corrective Actions

***Remember**: Stay Calm, Keep Away From Danger, Communicate Clearly and Concisely to All Key Parties. If Possible and Safe To Do So – Prevent the Situation From Worsening Until Help Arrives.*

Emergency Contact List – Primary Contacts

Company	Position	Contact Name	Contact Details
WHL	Duty Manager	Rotating	24Hr Mobile: 07818 573180 Email: duty.manager@wavehub.co.uk
MCA CGOC	Coastguard Operations	Duty Officer	VHF DSC channel 70 MMSI No: 002320014 VHF CH 16 Call Sign "UK COASTGUARD" Emergency Tel: 999 Emergency Mobile: 112 Email: zone24@hmcg.gov.uk / sar.response@mcga.gov.uk
UKHO	Radio Navigation Warnings (Urgent)		Tel: 01823 353448 Email: navwarnings@btconnect.com
MMO	Marine Pollution Response Team		24Hr Contact Tel: 03002 002024 Mobile: 07770 977825 Secondary 24Hr DEFRA Duty Tel: 03450 518486 Email: dispersants@marinemanagement.org.uk
Seatricity	Duty Manager (Local)	Andy Bristow	24Hr Tel: 01326 369511 Mobile (24Hr): 07860 419262 Email: apbristow@gmail.com
Trinity House	WHL A to N Contractor	Duty Operations	Emergency 24hr Tel: 01255 245100 Email: planning.centre@thls.org
Fugro Emu	WHL Wave Data Contractor	Duty Manager	Duty Phone (24hrs): 07810 697357 Email: fugroemumetocean@gmail.com
WHL	Managing Director	Claire Gibson	Office Tel: 01736 800290 Mobile: 07712 678884 Email: claire.gibson@wavehub.co.uk
WHL	Head of Operations	Julius Besterman	Office Tel: 01736 800290 Mobile: 07918 630852 Email: julius.besterman@wavehub.co.uk
SSE Contracting	WHL HV System Operators	Rotating Duty SAPs	Office Tel: 01752 755550 Emergency Out of Hours Tel: 08001 071991

Emergency Contact List – Secondary Contacts

Company	Position	Contact Name	Contact Details
Police	Camborne Police Enquiry Office (Covers Hayle)	PC Kevin Silver	Emergency Tel: 999 Emergency Mobile: 112 Routine Calls: 101 Email (local support and enquiries): hayle@devonandcornwall.pnn.police.uk
Falmouth Coastguard	Local CGOC	Duty Watch	Non-Emergency Station Tel: 01326 317575 Email: falmouthcoastguard@mcga.gov.uk
RNLI St. Ives Station	Lifeboat Station Manager		Tel: 01736 796422 Email: St-Ives@rnli.org.uk
NCI St. Ives	Station Manager Station	Helen Simpson Daylight Duty Watch	Tel: 01736 740129 Mobile: 07871 309283 Email: helensimpson545@gmail.com Tel: 01736 799398 Email: enq@nci-stives.org
Hayle Harbour	Harbour Master	Peter Haddock	VHF Ch 16 "HAYLE HARBOUR RADIO" Emergency 24hr Mobile: 07500993867 Office Tel: 01736 754043 Mobile: 07580992366 Email: peter.haddock@btconnect.com
St. Ives Harbour	Deputy Harbour Master	Ian Kemp	Tel: 01736 795018 Home Tel: 01736 795000 *(Local Rep. No Harbour Master Currently)*
Newquay Harbour	Harbour Master	Mike Ridgway	Tel: 01637 872809 Email: mridgway@cornwall.gov.uk *(Acting Council Rep for St Ives)*
Falmouth Harbour	Harbour Master	Mark Sansom	Tel: 01326 211395 Duty Email: dutyhm@falmouthharbour.co.uk
Royal Cornwall Hospital	A & E Treliske, Truro		Tel: 01872 250000
DDRC Plymouth	Diving Decompression Treatment		Emergency 24hr Tel: 01752 209999
Marine Accident Investigation Branch			Accident Reporting Line Tel: 023 8023 2527 Accident Report Email: maib@dft.gsi.gov.uk General Tel: 023 8039 5500
Environment Agency			EA Incident Hotline: 0800 807060 Local Area Office: 0370 850650
HSE – RIDDOR			Fatal and specified injuries only: 0845 3009923 Online Reporting: http://www.hse.gov.uk/riddor/report.htm
HSE Plymouth Office with Responsibility for Cornwall			Tel: 01752 226024
HSE	Renewable Energy Team	Trevor Johnson Steve Lewis	Tel: 01312 472001 Mobile: 07798 882087 Email: trevor.johnson@hse.gsi.gov.uk Tel: 02920 263065 Mobile: 07798 882094 Email: steve.area11.lewis@hse.gsi.gov.uk
HSE	Energy Division – Diving	Nick Deppe Mark Renouf	Tel: 02030 282734 (Ext 2734) Mobile: 07824 127789 Email: nick.deppe@hse.gov.uk Tel: 02030 281816 Email: mark.renouf@hse.gov.uk
Crown Estate	Manager - Wave and Tidal Senior Asset Manager	Helen Elphick Jason Golder	Tel: 02078 515152 Mobile: 07341 566189 Email: helen.elphick@thecrownestate.co.uk Tel: 02078 515186 Email: Jason.golder@thecrownestate.co.uk
UKHO	Hydrographic Notes Chart Corrections - SW	Chart Updates Christine Walton	Email: sdr@ukho.gov.uk Tel: 01823 337900 Email: chris.walton@ukho.gov.uk
MMO	Marine Case Manager Local Enforcement Officer	Lindsey Booth-Huggins Colin May	Tel: 02080 265351 Email: lindsey.booth-huggins@marinemanagement.org.uk Tel: 01736 757303 Email: colin.may@marinemanagement.gsi.gov.uk
Kingfisher (Seafish)	Fishing Safety Bulletins		Tel: 01472 252307 Email: kingfisher@seafish.co.uk
Trinity House General Lighthouse Authority	Navigation Directorate Navigation Services Officer Local AtoN Manager	- Steve Vanstone Joseph Anderson	Tel: 02074 816920 Email: navigation.directorate@thls.org Tel: 02074 816900 Email: stephen.vanstone@thls.org Tel: 02074 816926 Mobile: 07990 501975 Email: joseph.anderson@thls.org
Nixon Design Limited	Technical Director – OPANS Support	Luke Murray	Tel: 01736 758600 Email: luke@nixondesign.com Urgent Technical Issues (monitored 7 days a week): emergency@nixondesign.com
MCA Navigation Safety	Navigational Safety Branch	-	Tel: 02380 329523 Email: navigationsafety@mcga.gov.uk
MCA SAR Operations	Offshore Energy Officer	Peter Lowson	Tel: 02038 172070 Mobile: 07772 352612 Email: peter.lowson@mcga.gov.uk
MCA Wreck Discovery	Receiver of Wreck	Alison Kentuck	Tel: 02038 172575 Email: row@mcga.gov.uk
Maritime Archaeology	WSI Primary Archaeologist	Brandon Mason	Tel: 02380 237300 Email: brandon.mason@maritimearchaeology.co.uk
GoBe	WSI Reserve Archaeologist	Pete Gaches	Tel: 01626 323894 Email: pete@gobeconsultants.com
Wessex Archaeology	ORPAD Implementation Service (Wave Hub WSI)		Tel: 01722 326867 Email: protocol@wessexarch.co.uk
Trinity House Corporation	WHL A to N Contractor	Sophie Platten (Ops) Lynn Pomares (PM)	Tel: 01255 245046 Mobile: 07979 723203 Email: Sophie.Platten@thls.org Tel: 01255 245044 Email: Lynn.Pomares@thls.org
Fugro Emu	WHL Wave Data Contractor	Matt Linham (PM) Sarah Watt (Ops)	Tel: 02392 205 503 Mobile: 07917 852948 Email: matthew.linham@fugroemu.com Tel: 2392 205 515 Mobile: 07765 851378 Email: sarah.watt@fugroemu.com
Western Power Distribution – Grid Operator			Emergency Power Cut Tel: 0800 6783105 (or: 0330 1235001 from a mobile)
Western Power Operations Centre			02920 332827
SSE Contracting	HV Regional Manager SW	Jony Brown	Office Tel: 01752 755550 Mobile: 07767 851086 Email: jony.brown@ssecontracting.com
SSE Contracting	Designated Local SAP	David Coad	Mobile: 07747 559958 Email: david.coad@ssecontracting.com
Schneider	SCADA Provider	Murray Hepburn	Tel: 01179 709243 Mobile: 07724 350317 Emergency 24Hr Help Line: 01249 448338 Email: murray.hepburn@schneider-electric.com
Seatricity	Technical Director Managing Director	Bob Tillotson Peter Mitchell	Tel: 01869 226108 Mobile: 07857 141898 Email: bob.tillotson@seatricity.com Mobile: 07850 956854 Email: peter.mitchell@seatricity.com
JLT Specialty Ltd	WHL Insurance Brokers	Jonny Martin	Tel: 02075 583905 Mobile: 07880 099749 Email: jonny_martin@jltgroup.com
James Fisher	Technical Director	Richard Argall	Tel: 01326 218218 Mobile: 07800 894033 Email: r.argall@james-fisher.co.uk
WHL	Media Response	Helen Wilson-Prowse	Tel: 01736 800290 Mobile: 07825 943738 Email: helen.wilson-prowse@wavehub.co.uk
WHL	Commercial Response	Stuart Herbert	Tel: 01736 800294 Mobile: 07880 435559 Email: stuart.herbert@wavehub.co.uk
WHL Board	Chair	Bill Russell	Mobile: 07831 605733 Email: bill.russell@wavehub.co.uk
Burges Salmon LLP	Partner (WHL Lawyers)	Lloyd James	Tel: 01173 076925 Mob: 07896 174934 Email: lloyd.james@burges-salmon.com

Note: FORM-M019 Notice to Mariner Contact Schedule – LIVE – may contain further useful contacts.

Safety Management at Wave Hub – Roles and Responsibilities Overview

Key External Safety Duty Holders

Police and Crown Prosecution Service

- Policing and prosecuting criminal activity

Health and Safety Executive (HSE)

- Enforcement of the Health and Safety at Work Act 1974 and all associated regulations. Applies to all onshore and offshore worksites in connection with Wave Hub.

Maritime Coastguard Agency (MCA)

- Enforcement of the Merchant Shipping Act 1995 and all associated regulations. Applies to all vessels and offshore installations at the Wave Hub site.
- Lead on **SAR** response (Coastguard Operations Centre - CGOC)

Marine Management Organisation (MMO)

- Marine Licencing Regulation and Enforcement

Trinity House

- Enforcement of Aids to Navigation availability and standards

Renewable UK

- Disseminating and updating the accepted industry best practice guidelines: Offshore Wind and Marine Energy Safety Guidelines 2014
- Management of the industry safety performance database (RISE)

Contractors

- Responsible for quality, safety and environment risk management whilst completing a contract
- Compliance with legal safety requirements, the WHL OMS, industry best practice and the proposed Contractor Safety Management Plans throughout the contract
- Detailed operation, task, contingency and emergency planning based on thorough and competent risk assessment
- Contract, consent and permit in place and all conditions discharged
- Insurances maintained throughout
- Ensuring vessels, plant and equipment, tools and materials, safety equipment and PPE are fit for purpose, well maintained and thoroughly checked before use by a competent person
- Ensure all work is adequately controlled and only undertaken by qualified, experienced and competent operators with suitable equipment and supervision
- Communication and cooperation with WHL and all other permitted site Operators

Wave Hub Limited (WHL)

- Responsible for quality, safety and environment risk management for the overall Wave Hub site (landlord duties) and for Wave Hub infrastructure but not for Developer works and infrastructure within sublet sites
- Facilitate effective inter-Operator communications and planning
- Sublet site or working area boundary and access arrangement definition
- Validation of safety provisions for any Developer sub-leasing a site (WHL has landlord responsibilities in respect of Developer sublet sites)
- Management of WHL Contractors and obtaining consents for WHL contracted operations
- Wave Hub infrastructure responsibility (safety management, operation, maintenance, emergency response and contingency planning)
- Discharge of all Wave Hub baseline consent and lease conditions
- Operating, disseminating and maintaining the **Operational Management System (OMS),** the **Active Safety Management System (ASMS)** and the **Emergency Response Cooperation Plan (ERCoP)**
- Emergency response communications hub and emergency site shut-down function
- Key stakeholder engagement and safety advice to mariners and fishermen

Offshore Renewable Energy Technology Developers

- Responsible for quality, safety and environment risk management within the Developer's sublet site, for Developer Infrastructure and for Developer contracted operations
- Compliance with legal safety requirements, the WHL OMS, industry best practice and the validated Developer SMS throughout the project
- Ensure the reasonable suitability and survivability of the installed infrastructure and technology throughout the project
- Detailed engineering, operation, task, contingency and emergency planning based on thorough and competent risk assessment
- Emergency response training and periodic exercises
- Legal agreement, sub-lease, consent and permits in place and all conditions discharged
- Insurances maintained throughout
- Management of Developer Contractors and obtaining consents for Developer contracted operations
- Ensure vessels, plant and equipment, tools and materials, safety equipment and PPE are fit for purpose, well maintained and thoroughly checked before use by a competent person
- Ensure Developer personnel are all qualified, experienced, inducted, trained and competent in their roles and adequately supervised where necessary
- Communication and cooperation with WHL and all other permitted site Operators.

KEY

- ***External Safety Duty Holders and Responsibilities***
- ***WHL Responsibilities***
- ***Developer Responsibilities***
- ***Contractor Responsibilities (contracted by Developer or WHL)***

Device Deployment and Physical Connection

Equipment Design Review:
- **Third Party Validation** (*MOR-002)*
- **Electrical FEED Review** *(Connection Specification)*
- **Grid Stability Study** *(Independent Consultant Modelling and DNO Acceptance)*
- **Electrical Detailed Design Review** *(Connection Specification)*

Safety Review:
- **Validation of Developer SMS and ERPs** (*MOR-016/010)*
- **Review of Developer O&M Plans** *(MOR-007/004)*
- **MMO/MCA Approved Outline Project ERCoP Phase Information – Construction, Operation and Decommissioning** *(Plan-002 Wave Hub ERCoP)*

Pre-deployment inspections and checks:
- **TPV** (*MOR-002*)
- **Electrical Systems** *(Connection Specification)*
- **SCADA Interface Tests**

WHL Issue Permit to Operate for the agreed equipment for the agreed deployment duration
(*Subject to the limitations of the Developer's SMS, annual permit review and participation in annual emergency response exercises. For Full Requirements See: Form-M014*)

WHL Administration at Issue of Permit:
- Update Live Permit Log (*Form-M004*)
- Add Permit to Operate to OPANS (*OPANS User Guide*)
- Update AIS System – Berth/Planned Infrastructure (*Plan-001*)

Developer RAMS Submitted to WHL and MMO (*well in advance and in line with the Marine Licence conditions*):
- **Marine Installation and Engineering Plans** (*MOR-001/003/004/005/006/010/011*)
- **Electrical Connection and Test Plan** (*EOR-001/002/004/005*)

WHL Comment on Engineering and RAMS (*MOR-001/003*):
- Generated by a competent person to appropriate detail
- Reduce risks to ALARP
- Meet all WHL minimum requirements
- Safeguard the Wave Hub Asset (*MOR-003*)
- Detailed engineering design and assessment
- Minimise impacts on other site operators
- Include detailed and appropriate ERPs and contingent operation plans and equipment

Developer RAMS Accepted by MMO

Developer Application for Permit for Special Operations for Deployment Works with all required supporting information (minimum 4 weeks in advance). *For full requirements see: Form-M016.*

Developer Marine Site Safety Compliance – Planning and Co-ordination with Other Permitted Operators – Operation Added to the Wave Hub *Online Planning and Notification System* - OPANS – Minimum Notification 4 Weeks Ahead (*MOR-008/009*)

WHL validation of all required Permit Compliance Documentation and Engineering Plans, acceptance of RAMS and agreement on Residual Conditions.

Developer HIRA (or HAZOP) Held and RAMS / Engineering Finalised. *WHL to attend HIRA.*

Developer to finalise and submit to WHL the detailed Construction Phase information for the Wave Hub ERCoP *(Plan-002).*

WHL to Witness Developer Cable + Half DMC Electrical Integrity Tests onshore prior to load-out

WHL Vessel and Cable Handling Equipment Compliance Checks / Audits (*MOR-003/004/005/006*)

WHL Administration:
- **Issue Notice to Mariners for the Construction Works** (*MOR-012, Form-M003*) *– two weeks ahead of the works*
- Update Live Permit Log (*Form-M004*)
- Update AIS System Vessel Groups (*Plan-001*)
- **Issue Wave Hub ERCoP to MCA – Construction Phase (*Plan-002*)**

WHL Issue Permit for Special Operations for Deployment Works (*For Full Requirements See: Form-M016, permit also subject to discharge of all relevant Marine Licence Conditions).*

Developer Operations Commence – Equipment Deployment and Electrical Connection – Developer Adds Offshore Site Access Notifications for Each and Every Vessel Utilised on OPANS – OPANS Access Notification At Least 12 Hours Ahead of planned site access (*MOR-009, Form-M010 if OPANS unavailable*)

Operations Progress Reporting - Developer Disseminates DPRs and Adds Access Reports After Every Site Access on OPANS – OPANS Access Report required Within 2 Hours of departure from site (*MOR-008/009, Form-M010 if OPANS unavailable*)

Offshore Electrical Connection of cable system from DMC to Device subject to the process and HV electrical permitting requirements set out in *EOR-001/002/004/005*. (*The agreed electrical test plan must be followed and test failures addressed*).

WHL In-Progress Operations Safety Management / Monitoring:
- ***WHL Representation on board installation vessel during handling of Wave Hub Cable***
- Review of DPRs (*Form-M006 or similar*) and Access Reports (OPANS or *Form-M010*). ***These should include as-built equipment co-ordinates contemporaneously.***
- Accident or Incident Reporting / Non-conformance and Hazard Reporting including Investigation / Corrective / Preventive Action Management (*MOR-007/010/019*, *Form-M007/M009*)
- Safety Monitoring (*MOR-016*) including:
  - OPANS/AIS/VHF – for checking safe working and co-operation (*MOR-008*)
  - SIMOPs Communication Plans where required (*Form-M002*)
  - RAMS / Toolbox Talk Checks
- **Issue of Notice to Mariners for any critical safety notification or works update** (*MOR-012, Form-M003*)

Wave Hub Duty Manager – Emergency Response Communications Function
- Wave Hub Marine Emergency Response Plan: *MOR020*
- Wave Hub Duty Manager's Emergency Electrical Shutdown via SCADA: *SCOUT*
- Wave Hub ERCoP – Construction Phase: *Plan-002*

Developer Application to Import Power to Device (Form-E031)

Provision of **Power to Device** subject to the process and HV electrical permitting requirements set out in *EOR-002.*

Developer Application to Generate (Form-E032)

Commencement of Generation subject to the process and HV electrical permitting requirements set out in *EOR-002/004/005. (WPD to be notified by WHL).*

Developer Operations Concluded – Device Commissioned – Developer Reports Deployment Operations Complete on OPANS (*MOR-009, Form-M010 if OPANS unavailable*)

Post installation reporting to WHL and MMO *(in accordance with Marine Licence Conditions and MOR-001)*

WHL Administration:
- Close Permit for Special Operations (*Form*-M016) and Update Live Permit Log (*Form-M004*)
- Update AIS System: As-Built Equipment Locations and O&M Vessel Groups (*Plan-001*)
- **Issue Notice to Mariners for the Construction Works Completion** (*MOR-012, Form-M003*)
- **Issue Wave Hub ERCoP to MCA – Operational Phase (*Plan-002*)**

Operation and Safety Review (*MOR-001/007*)**:**
- WHL to Receive Post-Installation Reportable Information (*MOR-001*)
- WHL to validate Developer O&M arrangements (*MOR-007*)
- All MMO Marine Licence Conditions Discharged
- Post-Installation Review to be held with Developer (*within one month*)
- Operational Emergency Planning Exercise to be held annually each autumn (*Plan-001/002*)

KEY
- ***WHL Emergency Response Function***
- ***WHL Input & Controls***
- ***Developer Input***
- ***Wave Hub Permits***

Marine Operations Requirement (WAVE HUB-OMS-MOR-023)

Geotechnical Investigation and Subsea Drilling

These requirements apply to any permitted marine geotechnical operation at the Wave Hub offshore site.

Task	Requirements
Geotechnical Investigation and Subsea Drilling	***Professional Attendance*** The Contractor shall provide sufficient suitably qualified and experienced engineering geologists / geotechnical engineers to ensure full time professional attendance. The engineering geologists / geotechnical engineers deployed shall be capable of supervising all boring, drilling, field and in-situ testing throughout the operation (24-hour cover where necessary). For geotechnical or drilling operations, the competency and contact details are required for the following key personnel: • Onshore Duty Manager, Project Manager and Offshore Party Chief • Vessel Master and DPOs • Lead Offshore Geotechnical Engineer(s) / Geologist(s) • Lead Driller(s) / Rig / Equipment Operator(s) ***Technical Standards*** The Contractor shall adhere to the most appropriate technical standards and use the most suitable equipment for carrying out the works in accordance with the requirements of industry best practice. A sector scanning sonar and depth sensor shall be attached to the seabed frame. These shall be used to locate the position of the seabed frame relative to any obstructions that may be present. Borehole operations shall be undertaken from a suitable platform or deck, either heave compensated or hard tied to the seabed. Borehole testing shall be independent of any moving platform and may only be connected to such a platform by flexible hoses, wires or cables. The Contractor shall assess and manage Metocean limits for the following scenarios: • Abandonment of boarding/transit operations • Abandonment of investigation (drilling, in-situ testing etc) operations • Abandonment of positioning operations • Abandonment of the site for refuge The Contractor shall provide a robust method for horizontal and vertical positioning and recording of exploratory hole locations. The maximum permissible distance of the borehole location shall be 2m from the planned position.

Wrecks and Unexploded Ordnance (UXO)

Side scan sonar and magnetometer surveys have been undertaken across the site. Drill locations and associated infrastructure shall be sited in consideration of sonar or magnetometer contacts and further survey conducted where required and proximity to identified anomalies cannot be avoided. Such additional survey may be triggered by Contractor Risk Assessment, the Wave Hub WSI requirements or Marine Licence conditions. Survey shall always be completed in accordance with the standards set out in the **Wave Hub WSI** to allow consolidated assessment of cumulative data.

Shallow Gas

The Contractor shall review the documents provided to ascertain the likelihood or otherwise of the risk of shallow gas within the work site. The Contractor shall include in the RAMS any mitigating measures, if required, that the Contractor intends to take to ensure the safe completion of the works.

Drilling Fluid Type and Collection

The drilling fluid used should be CEFAS approved or seawater/guar-gum/seawater-guar-gum-mix. Drilling fluid returns must be appropriately controlled.

Monitoring Equipment

The survey vessel shall be equipped with suitable sensors and devices to permit continual monitoring and recording of essential survey parameters.

Marine Equipment Certification and Calibrations

All wire ropes and load cells used during the work shall be fit for purpose, certified, well maintained and inspected by a competent person prior to use.

Disturbance of the Sea Bed

The Contractor shall take all necessary measures to limit any disturbance of the sea bed strictly to that necessarily for the proper performance of the works. The Contractor shall ensure that all areas disturbed are restored to a safe and stable condition as close to the as-found condition as possible with consideration to the original levels, structures and composition.

Materials Found

The title to water, soil, rock, gravel, sand, minerals, timber, and any other materials developed or obtained and the right to use said materials or dispose of same is hereby expressly reserved by WHL on behalf of the land owner.

All laboratory testing shall be carried out at an approved geotechnical laboratory, which has been accredited by the United Kingdom Accreditation Service (UKAS) or another equivalent industry accepted accreditation body.

Marine Operations Requirement (WAVE HUB-OMS-MOR-024)

Wave Hub Aids to Navigation Maintenance

These requirements apply to planned servicing and emergency recovery or fault correction of the Wave Hub Aids to Navigation.

Task	Requirements

Wave Hub Aids to Navigation Maintenance	• The Wave Hub Aids to Navigation provide a crucial function in clearly marking the deployment site for the safety of all third-party mariners. Effective maintenance is required to ensure that these Aids to Navigation remain fit for purpose and meet the required IALA Availability Criteria. The general scope of the Contracted maintenance services is:
	  ◦ To provide reliable site navigational marking to stated IALA requirements.
	  ◦ To inspect, maintain and upgrade the navigation marks and moorings as required
	  ◦ To provide emergency response services in relation to confirmed AtoN failures and incidents
	• WHL will endeavour to ensure that all marks have 250m radius clear working zones around them (*MOR008*) where other controlled site users and site infrastructure are excluded (to avoid infrastructure proximity conflicts). *Third party mariners and fishermen will be advised through Notices to Mariners to maintain safe clearance where required.*
	• The Contractor shall adhere to applicable technical standards and use suitable vessels, equipment and professionally competent personnel for carrying out the works in accordance with the requirements of industry best practice. The Contractor must be familiar with the provision and maintenance of Aids to Navigation.
	• A DP capable vessel equipped with an accurate positioning system is preferential for this type of work. The Contractor's vessel must not enter or transit the Wave Hub 'Renewable Energy Development Area' during the works.
	• Buoy maintenance shall always be undertaken upon the deck of the service vessel and due consideration given to buoy and mooring retrieval and replacement in the RAMS and works planning (MOR013). All lifting equipment is to be inspected, certificated and maintained in accordance to LOLER and Class Requirements (*MOR004*).
	• The maintenance Contractor's RAMS must include for routine maintenance and inspection (annual for Wave Hub marks) as well as emergency intervention / buoy recovery.
	• The Vessel Master is ultimately responsible for the safety of the vessel, associated infrastructure and all personnel on board during operations. They must ensure that the relevant Wave Hub Permit to Operate conditions, Marine Operations Requirements, RAMS and associated equipment and personnel specifications, Vessel Safety Management System and UK MCA Maritime Regulations are all complied with.

Wave Hub Aids to Navigation Maintenance *(Continued)*

Assigned Positions:

- WHL must be informed if marks appear to have dragged.
- The primary 5t sinker location on redeployment shall be within a radius of 10m of the coordinates below.
- Moorings shall then be laid as best determined by the vessel master according to the characteristics for the location and best practice (*note however, that the SW special mark should always be laid in an easterly direction - away from the Wave Hub subsea cable*).

Wave Hub AtoN Name	Details	Assigned Position (WGS84)
Wave Hub NW **N18100**	North Cardinal – 3m Diameter Buoy *(Mobilis Composite Buoy – New 2014)* AIS Station + 6m Focal Plane, White 7nm Light: VQ	**050° 23.059' N** **005° 38.241' W**
Wave Hub SE **N18107**	South Cardinal – 3m Diameter Buoy (*Mobilis Composite Buoy – New 2014)* 6m Focal Plane , White 7nm Light: VQ(6)+LFl(1)10s	**050° 20.637' N** **005° 35.006' W**
Wave Hub Site – NW **N18101**	Special Mark – 3m Diameter Buoy (*Briggs Steel Buoy – New 2012)* 4m Focal Plane, GPS Synchronised, Yellow 5nm Light: FL.Y.5s (Sync)	**050° 22.791' N** **005° 37.943' W**
Wave Hub Site – NE **N18102**	Special Mark – 3m Diameter Buoy (*Fendercare Steel Buoy – New 2010)* 4m Focal Plane, GPS Synchronised, Yellow 5nm Light: FL.Y.5s (Sync)	**050° 22.999' N** **005° 35.901' W**
Wave Hub Site – SE **N18106**	Special Mark – 3m Diameter Buoy (*Briggs Steel Buoy – New 2012)* 4m Focal Plane, GPS Synchronised, Yellow 5nm Light: FL.Y.5s (Sync)	**050° 20.894' N** **005° 35.378' W**
Wave Hub Site – SW **N18105**	Special Mark – 3m Diameter Buoy (*Briggs Steel Buoy – New 2012)* 4m Focal Plane, GPS Synchronised, Yellow 5nm Light: FL.Y.5s (Sync)	**050° 20.541' N** **005° 37.196' W**

The up to date status of the Wave Hub Aids to Navigation can be found at: https://www.wavehub.co.uk/notice-to-mariners
Full equipment specifications will be shared with the Contractor via the WHL Box file share system.

IALA Availability Specification:

Overall, the Wave Hub Aids to Navigation are rated IALA Category 2 specified as 'an AtoN or system of AtoN that is considered by the Competent Authority to be of important navigational significance'. The IALA categories of availability specified for Wave Hub Aids to Navigation characteristics are therefore:

- Position - Category 2 (99.0%)
- Light - Category 2 (99.0%)
- Topmark - Category 3 (97%)
- Daymark - Category 3 (97%)
- AIS (North Cardinal Mark only) – Category 3 (97%)

Device Removal and Physical Disconnection

Developer RAMS Submitted to WHL and MMO (*well in advance and in line with the Marine Licence conditions*):
- **Marine Decommissioning Plan** (*MOR-001/003/004/005/006/010/011*)
- **Electrical Disconnection and Test Plan** (*EOR-004/005/006)*

WHL Comment on RAMS (*MOR-001*):
- Generated by a competent person to appropriate detail
- Reduce risks to ALARP
- Meet all WHL minimum requirements
- Safeguard the Wave Hub Asset (*MOR-003*)
- Detailed engineering design and assessment
- Minimise impacts on other site operators
- Include detailed and appropriate ERPs and contingent operation plans and equipment

Developer RAMS Accepted by MMO

Developer Application for Permit for Special Operations for Decommissioning Works with all required supporting information (minimum 4 weeks in advance). *For full requirements see: Form-M016*.

Developer Marine Site Safety Compliance – Planning and Co-ordination with Other Permitted Operators – Operation Added to the Wave Hub *Online Planning and Notification System* - OPANS – *Minimum Notification 4 Weeks Ahead* (*MOR-008/009*)

Developer HIRA (or HAZOP) Held and RAMS Finalised. *WHL to attend HIRA.*

Developer to finalise and submit to WHL the Decommissioning Phase information for the Wave Hub ERCoP *(Plan-002).*

WHL validation of all required Permit Compliance Documentation, acceptance of RAMS and agreement on Residual Conditions.

WHL Vessel and Cable Handling Equipment Compliance Checks / Audits (*MOR-003/004/005/006*)

WHL Administration:
- **Issue Notice to Mariners for the Decommissioning Works** (*MOR-012, Form-M003*) – *two weeks ahead of the works*
- Update Live Permit Log (*Form-M004*)
- Update AIS System Vessel Groups (*Plan-001*)
- **Issue Wave Hub ERCoP to MCA – Decommissioning Phase (*Plan-002*)**

WHL Issue Permit for Special Operations for Decommissioning Works (*For Full Requirements See: Form-M016, permit also subject to discharge of all relevant Marine Licence Conditions).*

Developer Operations Commence – Equipment Removal and Electrical Disconnection – Developer Adds Offshore Site Access Notifications for Each and Every Vessel Utilised on OPANS – OPANS Access Notification At Least 12 Hours Ahead of planned site access (*MOR-009, Form-M010 if OPANS unavailable*)

Operations Progress Reporting - Developer Disseminates DPRs and Adds Access Reports After Every Site Access on OPANS – OPANS Access Report required Within 2 Hours of departure from site (*MOR-008/009, Form-M010 if OPANS unavailable*)

WHL In-Progress Operations Safety Management / Monitoring:
- ***WHL Representation on board offshore construction vessel during handling of Wave Hub Cable***
- Review of DPRs (*Form-M006 or similar*) and Access Reports (OPANS or *Form-M010*).
- Accident or Incident Reporting / Non-conformance and Hazard Reporting including Investigation / Corrective / Preventive Action Management (*MOR-007/010/019, Form-M007/M009*)
- Safety Monitoring (*MOR-016*) including:
  - OPANS/AIS/VHF – for checking safe working and co-operation (*MOR-008*)
  - SIMOPs Communication Plans where required (*Form-M002*)
  - RAMS / Toolbox Talk Checks
- **Issue of Notice to Mariners for any critical safety notification or works update** (*MOR-012, Form-M003*)

Wave Hub Duty Manager – Emergency Response Communications Function
- Wave Hub Marine Emergency Response Plan: *MOR020*
- Wave Hub Duty Manager's Emergency Electrical Shutdown via SCADA: *SCOUT*
- Wave Hub ERCoP – Construction Phase: *Plan-002*

Offshore Physical Disconnection of Device and cable system back to the DMC subject to the process and HV electrical permitting requirements set out in *EOR-004/005/006.* (*The agreed electrical test plan must be followed and test failures addressed*).

Developer Operations Concluded – Device Decommissioned – Developer Reports Decommissioning Operations Complete on OPANS (*MOR-009, Form-M010 if OPANS unavailable*)

Wave Hub DMC on Developer Cable to be returned to ETA Connect Limited by Developer for Refurbishment

Post removal reporting to WHL and MMO *(in accordance with Marine Licence Conditions and MOR-001)*

WHL Administration:
- Close PSO and PTO (*Form-M016/M014*) and Update Live Permit Log (*Form-M004*)
- Update AIS System: Remove Berth/Equipment/Vessel Groups (*Plan-001*)
- Close PTO on OPANS and Remove Developer Access (*OPANS User Guide*)
- **Issue Notice to Mariners for the Decommissioning Works Completion** (*MOR-012, Form-M003*)
- **Issue Wave Hub ERCoP to MCA – Berth Empty (*Plan-002*)**

Operation and Safety Review (*MOR-001/007*)**:**
- WHL to Review Post-Removal Reportable Information (*MOR-001, MMO Marine Licence and Crown Estate Requirements*)
- All MMO Marine Licence Conditions Discharged (*MMO Approval Received*)
- Termination or End of Berthing Agreement and Dissolution of Sub-Lease

KEY
- ***WHL Emergency Response Function***
- ***WHL Input & Controls***
- ***Developer Input***
- ***Wave Hub Permits***

Operational Switching and Offshore Working

PLANNED ISOLATION

WHL Planned Isolation for Sub-Station Maintenance or Testing

WHL Notification of system isolation for sub-station works added to OPANS (*two weeks ahead where possible*)

Wave Hub Offshore Isolations Implemented in accordance with EOR-005/006

WHL Works Completed

WHL Notification of completion of works at sub-station added to OPANS

System Re-energised and Developers Re-connected in accordance with EOR-002/004/005

Developer application for Isolation at Sub-station (*minimum 2 weeks in advance*) accompanied with detailed task specific RAMS including, where relevant:

- **Marine Plans** (*MOR-004/007/010/011*)
- **Electrical Plans** (*EOR-002/004/005/006*)

Developer detailed RAMS reviewed by WHL. WHL validation of all required Permit Compliance Documentation.

Note: *this process applies where outline O&M plans have been validated under the Developer's PTO. Major Device maintenance or array alteration will require a PSO. For Device removal or shut-down then MOR-025 applies. For major modifications (within agreed limits), re-installing or adding a Device or cables then MOR-022 applies.*

WHL Administration:

- Update AIS System: Vessel Groups
- Issue Notice to Mariners for Works if required (*MOR-012, Form-M003*)

WHL Notification of circuit or system isolation added to OPANS (*two weeks ahead where possible*)

Wave Hub Offshore Isolations Implemented in accordance with EOR-005/006

Developer planned works behind Developer Circuit Breaker

Developer detailed RAMS reviewed by WHL. WHL validation of all required Permit Compliance Documentation.

Note: *this process applies where Wave Hub isolation is not required and where outline O&M or contingency plans have been validated under the Developer's PTO. Major changes or repairs may (at WHL's discretion) require a PSO (MOR-022 applies).*

WHL Administration:

- Update AIS System: Vessel Groups
- Issue Notice to Mariners for Works if required (*MOR-012, Form-M003*)

UNPLANNED ISOLATION

Developer Circuit Breaker Trip (Wave Hub Circuit Still Live)

Developer Fault Finding Process Implemented

Fault Identified. Detailed Contingency Plans (RAMS) Developed and Submitted for WHL Review including, where relevant:

- **Marine Plans** (*MOR-004/007/010/011*)
- **Electrical Plans** (*EOR-002/004/005/006*)

Developer detailed RAMS reviewed by WHL. WHL validation of all required Permit Compliance Documentation.

Note: *this process applies where Wave Hub isolation is not required and where outline O&M or contingency plans have been validated under the Developer's PTO. Major changes or repairs may (at WHL's discretion) require a PSO (MOR-022 applies).*

WHL Administration:

- Update AIS System: Vessel Groups
- Issue Notice to Mariners for Works if required (*MOR-012, Form-M003*)

Wave Hub Circuit Breaker Trip

WHL Notification of system status added to OPANS

Wave Hub EOR-007 Subsea Cable Fault Finding Process Implemented

Fault Identified. WHL OR Developer (as appropriate) Contingency Plan initiated. For Repair of Developer Cable/Accessory Faults the Process in MOR-022 Applies. *For WHL Repairs, OPANS will be updated regularly with estimated time to repair and operational details once marine services are contracted.*

Developer Offshore Electrical Repairs of cable system from DMC to Device subject to the relevant process and HV electrical permitting requirements set out in *EOR-001/002/004/005/006.*
(*The agreed electrical test plan must be followed and test failures addressed*).

Device, Cable or Accessory Repaired (*MOR-022 for Developer Cable System Repairs*)

WHL Notification of works completion added to OPANS

System Re-energised and Developers Re-connected in accordance with EOR-002/004/005

Developer Marine Site Safety Compliance – Planning and Co-ordination with Other Permitted Operators – Operation Added to OPANS – Minimum Notification 2 Weeks Ahead (*MOR-008/009*)

Developer Operations Commence – Developer Adds Offshore Site Access Notifications on OPANS – OPANS Access Notification At Least 12 Hours Ahead of planned site access (*MOR-009, Form-M010 if OPANS unavailable*)

Operations Progress Reporting - Developer Adds Access Reports After Every Site Access by a Project Vessel on OPANS – OPANS Access Report required Within 2 Hours of departure from site (*MOR-008/009, Form-M010 if OPANS unavailable*)

WHL In-Progress Operations Safety Management / Monitoring:

- Review of Access Reports (OPANS or *Form-M010*). ***These should include as-built equipment co-ordinates contemporaneously.***
- Accident or Incident Reporting / Non-conformance and Hazard Reporting including Investigation / Corrective / Preventive Action Management (*MOR-007/010/019*, *Form-M007/M009*)
- Safety Monitoring (*MOR-016*) including:
  - OPANS/AIS/VHF – for checking safe working and co-operation (*MOR-008*)
  - SIMOPs Communication Plans where required (*Form-M002*)
  - RAMS / Toolbox Talk Checks
- **Issue of Notice to Mariners for any critical safety notification or works update** (*MOR-012, Form-M003*)

Wave Hub Duty Manager – Emergency Response Communications Function

- Wave Hub Marine Emergency Response Plan: *MOR020*
- Wave Hub Duty Manager's Emergency Electrical Shutdown via SCADA: *SCOUT*
- Wave Hub ERCoP – Operational Phase: *Plan-002*

Where Isolation at Sub-station is required by Developer to effect repair or maintenance

Offshore Electrical Disconnection of Device subject to the HV electrical permitting requirements set out in *EOR-004/005/006.*

Offshore Electrical Re-Connection of Device subject to the HV electrical permitting requirements set out in *EOR-001/002/004/005*.

Provision of **Power to Device** subject to the requirements set out in *EOR-002.*

Where Isolation only at the Developer Circuit Breaker is required to effect safe repair or maintenance OR where an adjacent Developer array has been isolated at WHL instruction.

Re- Commencement of Generation subject to the process and requirements set out in *EOR-002/004/005. (WPD to be notified by WHL).*

Developer Operations Concluded –Developer Reports Works Complete on OPANS (*MOR-009, Form-M010 if OPANS unavailable*)

WHL Notification of circuit or system re-energisation added to OPANS

Post works reporting to WHL

WHL Administration:

- Update AIS System: As-Built Equipment Locations and Vessel Groups (*Plan-001*)
- Issue Notice to Mariners for Completion of Works if required (*MOR-012, Form-M003*)
- Update/Issue update of Wave Hub ERCoP to MCA – Operational Phase *if required (Plan-002)*

KEY

- ***WHL Emergency Response Function***
- ***WHL Input & Controls***
- ***Developer Input***
- ***Wave Hub Permits***

Appendix B – Marine Operation Forms

MARINE OPERATION FORMS
FORM-M001 WHL Contractor HSEQ Questionnaire
FORM-M002 SIMOPs Communications Plan Template
FORM-M003 Maritime Safety Information
FORM-M004 Permit Log
FORM-M005 WHL Contract Variation Forms
FORM-M006 WHL Daily Progress Report
FORM-M007 Accident-Incident Report
FORM-M009 Non-conformance and Hazard Report
FORM-M010 Offshore Site Access Log
FORM-M011 WHL Offshore Visitor Form
FORM-M012 WHL Toolbox Talk Form
FORM-M013 WHL RAMS Template
FORM-M014 Developer Permit to Operate
FORM-M015 Contractor Permit to Operate
FORM-M016 Permit for Special Operations
FORM-M019 Notice to Mariner Contact Schedule

WHL CONTRACTOR HSEQ QUESTIONNAIRE

Contractor			
Contract			
Date		**Works Manager**	

Does CONTRACTOR have an implemented Quality Assurance System? Please provide details and attach the policy and any related certification (e.g. ISO 9001)

Does CONTRACTOR have an implemented Safety Management System? Please provide details and attach the policy and any related certification (e.g. ISO 45001, OHSAS 18001 or HSG65)

Does CONTRACTOR have an implemented Environmental Management System? Please provide details and attach the policy and any related certification (e.g. ISO 14001)

Please provide incident statistics for the last 5 years including for any sub-contractors nominated:

- **Number of fatalities**
- **Number of lost time incidents**
- **Number of environmental incidents**
- **Number of near miss reports**

Please provide details of any criminal prosecutions or HSE enforcement proceedings in the last 5 years or currently pending for the CONTRACTOR and Sub-contractors

Please provide a project organogram and attach CVs for key personnel (including subcontractors)

Please provide company experience and track record in comparable projects including two references or referees from previous clients

Company Director	**Signature**		**Name**	
	Position		**Date/Time**	

Simultaneous Operations Communication Plan

Operations Summary

Operator (Developer or Main Contractor)			
Operation Title / Summary			
Tasks to be Undertaken During SIMOPs			

Operations Management – Key Contacts

Key Contacts	Name	Number	Name	Number	Name	Number
Onshore Duty Manager						
Onshore Project Manager						
Onshore Marine Coordinator						
Offshore Operations Manager						

Vessel Details

Vessel Name	Contracting Operator	Vessel Type / Role	Call Sign + MMSI	Ship Telephone	Master's Name	Master's Telephone

VHF Channel Allocation

Vessel Name	Marine Coordination	Bridge Comms 1	Bridge Comms 2
Inter-Operator Agreed VHF Communications Channel			

Internal Communications Detail and Allocation (e.g. UHF)

Vessel Name	Internal Comms 1	Internal Comms 2	Internal Comms 3

Details of Positioning Equipment (Surface & Sub-Sea) Which Could be Subject to or Cause Interference

Vessel Name	Device Name	Device Type / Function	Operating Frequencies

Wave Hub Maritime Safety Information Form

Operator	
Project Title	

1 Summary work scope or project description

2 Geographic co-ordinates and chart of site and infrastructure

All positions must be quoted in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes

3 Safe clearances, navigation safety features and safety notes for mariners and other permitted site users

4 Outline programme of works

Works:

Equipment Deployment:

5 Vessel details

Vessel Name:		
Vessel Type / LOA(m):		
Vessel Function:		
VHF Call Sign:		
MMSI:		
Vessel Operator Telephone:		
Vessel Operator Email:		
Works Operating Port / Anchorage:		

6 Operator Contact Details

Project Manager:
Telephone:
Email:
Operator Duty Phone (24hrs – Emergency Use ONLY):

Wave Hub Permit Log

Live permit log to be filed at: Box Sync\Shared\OMS\FINAL OMS\Marine Safety System\Marine Operation Permits and Logs - LIVE

Permit Ref / Type	Operator	Operation Title	Works Location	Date of Last Issue	Valid From: Date / Time	Expiry Date	Expiry Time	Permit Status

Wave Hub Permit Log

Live permit log to be filed at: Box Sync\Shared\OMS\FINAL OMS\Marine Safety System\Marine Operation Permits and Logs - LIVE

Permit Ref / Type	Operator	Operation Title	Works Location	Date of Last Issue	Valid From: Date / Time	Expiry Date	Expiry Time	Permit Status

VARIATION ORDER REQUEST (VOR)

VOR Title:	
Client/Company: Wave Hub Limited (WHL)	VOR No.
Contractor:	Sheet 1 of ……

1. VOR originated by (*delete as appropriate*): **WHL / Contractor**

2. Description of Variation Order (*attach and reference additional sheets if necessary*):

3. Evaluation Summary:

   Cost Basis: _____ (*lump sum / unit rate / day rate / other*)

   Total Price of Variation: _____ (*lump sum / capped budget*)

   Schedule Impact (*full detail can be attached in a revised programme*): _____

   Basis of Estimate:

   (*full supporting documentation, technical assessment and or justification to be attached as appropriate*)

Signed for and on Behalf of Wave Hub Limited:	Signed for and on Behalf of Contractor:
WHL Representative	*Contractor Representative*
Name:_____	Name:_____
Signature:_____	Signature:_____
Date: _____	Date: _____

VARIATION ORDER APPROVAL (VOA)

VOA Title:		
Contract:		
Client/Company: Wave Hub Limited (WHL)	VOA No:	Associated VOR No:
Contractor:	Sheet 1 of ……..	

1. Scope of Variation (*attach and reference additional sheets if required*):

2. CONTRACTOR is hereby authorised to proceed with the work described above subject to all terms and conditions of the CONTRACT except as modified by this variation approval.

   Any request for payment in connection with this variation shall be separately identified on CONTRACTOR's invoice quoting this VOA number.

3. Cost Summary:

   Total Price of Variation: _____ (*Lump Sum / Capped Budget*) exclusive of VAT to complete the scope of work above to WHL's satisfaction.

   (*attach and reference contractor's variation proposal or quotation where supplied*)

WHL may at any time suspend or abandon the works defined under a VOA. Upon receipt of any such written notice the Contractor shall take immediate steps to bring the works to a close safely and to reduce expenditure to a minimum.

4. Schedule Impact Summary

   Work to commence by : _____

   Work to be completed by: _____

   Consequential Schedule impact (*if any*) _____

Signed for and on Behalf of Wave Hub Limited:	Signed for and on Behalf of Contractor:
WHL Director	*Contractor Director*
Name:_____	Name:_____
Signature:_____	Signature:_____
Date: _____	Date: _____

WHL Marine Operations Daily Progress Report Form

Operator:			
Operation Title:			
Daily Progress Report Reference Number:			
Date & Time of Issue:			
For Period:		**Time Zone (*please select*):**	**Winter UTC / Summer UTC+1**
Vessel:			

1. Distribution

Name	Company	E-Mail

2. Summary of activities (last 24 hours)

Number:	Activity:
1	
2	
3	
4	

3. Vessel position at midnight

24:00 Position	**Latitude 050°**	**'N**	**Longitude 005°**	**'W**
Vessel Status:				
Vessel Location:				

All positions to be quoted in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes

4. Weather conditions for period

Weather Today		
Time	**Last 24 Hours**	**Forecast Next 24 Hours**
General		
Wind Direction		
Wind Speed (m/s)		
Significant Wave Height (m)		
Swell Direction		
Maximum Current Speed (m/s)		
High Water (Time)		
Low Water (Time)		
Tidal Range (m)		
Lightning Risk or Occurrence		
Summary Outlook from 5 Day Forecast		

5. Personnel on-board

Previous Total POB	On	Off	New Total POB
Personnel Issues:			

WHL Marine Operations Daily Progress Report Form

6. Work time analysis

Task	Previous Total	Hours Today	New Total
Mobilisation/demobilisation	0	0	0
Vessel transit	0	0	0
Vessel standby in port	0	0	0
Calibrations/trials	0	0	0
Operational	0	0	0
Weather downtime	0	0	0
Vessel / equipment downtime	0	0	0
Other (*please define*)	0	0	0

7. HSE activities and reports

Activity	Delivered By	Previous	Today	Total
SIMOPs Briefing		0	0	0
Vessel Induction		0	0	0
Project Induction		0	0	0
Toolbox Talk		0	0	0
Safety Meeting		0	0	0
Safety Inspection		0	0	0
SJA		0	0	0
Safety Observations Received		0	0	0
Hazard Identification / Near Miss		0	0	0
Non-Conformance		0	0	0
Lost Time Incidents		0	0	0
Personnel Accidents		0	0	0
ERP Drills		0	0	0
Accident Free Days		0	0	0
Operator Remarks:				
Vessel Master Remarks:				

Attach Accident Reports Where Applicable

8. Key equipment status

Resource	Status	Comments
Vessel		
Crane(s)		
Cable Handling Spread		

9. Materials to be installed

Materials	Location	Status

WHL Marine Operations Daily Progress Report Form

10. Daily detailed log of events

Time	Event

11. Completions

Task	Start Date/Time	% Complete	Completed Date/Time	Total Hours Taken

12. Work planned next 24 hours (in task order)

Task	Detail

13. Operations manager comment (*progress, issues, notes and recommendations*)

Works Progress (% Complete):	

14. WHL or WHL Representative comment

Signatures

All relevant information relating to the works for the last 24hrs is provided accurately and fully in this report.

DPR Submitted By	Company	Position	Signature

DPR Accepted By	Company	Position	Signature

ACCIDENT / INCIDENT REPORT FORM

1. Report Author and Location / Activity Details

Name:		**Incident Location:**	
Position:		**Activity in Progress:**	
Company:			
Contact Tel:		**Incident Date:**	
Contact Email:		**Incident Time:**	

2. Details of Person Injured and Injury (*if applicable*)

Name		**Gender:**	**Male**		**Female**		**Age:**		
Position									
Employer					**Employer Notified:**		**Yes / No**		
Phone									
Member of Public?	**Yes**		**No**						

Did person:		**Was the injury:**		**Part of body:**	
Become unconscious		**A fatality**		**Description of injury:**	
Need resuscitation		**Major**			
Remain in hospital > 24hrs		**LTI > 7 days**			
		First aid only			

3. Accident / Incident Summary

Site of Accident / Incident

Offshore (In Transit)		**Offshore Wave Hub Site**		**Wave Hub Substation**		**Wave Hub Office**		**Offshore Developer Site**	

Accident / Incident Category

Machinery & Plant		**Moving, Falling Objects**		**Vehicle Collision**		**Hit Fixed Object**		**Manual Handling**		**Fire/Explosion**	
Harmful Substance		**Electricity**		**Confined Spaces**		**Falls from Height**		**Slips, Trips & Falls**		**Fall into Water**	
Injured by Animal		**Assault by Person**		**Exposure to Elements**		**Offshore Infrastructure**		**Vessel Incident**		**Other: .....**	

Accident/Incident Outcome – Damage Assessment

People	**None**		**Near Miss**		**Trivial**		**Minor**		**Major**		**Catastrophic**	
Equipment	**None**		**Near Miss**		**Trivial**		**Minor**		**Major**		**Catastrophic**	
Environment	**None**		**Near Miss**		**Trivial**		**Minor**		**Major**		**Catastrophic**	
Business	**None**		**Near Miss**		**Trivial**		**Minor**		**Major**		**Catastrophic**	

Working and/or Weather Conditions at Time of Accident / Incident

4. Description of Accident / Incident (*include drawings where necessary*)

5. Suggested Immediate Cause(s)

People Involved	**Not a Factor**		**Unsuitable?**		**Competency?**		**Competent but did wrong thing?**	
Place of Work	**Not a Factor**		**Inadequate?**		**Not maintained?**		**Not provided?**	
Procedures	**Not a Factor**		**Procedure not used?**		**Procedure lapsed?**		**No procedure?**	
Equipment / Plant / Substance	**Not a Factor**		**Controls not used?**		**Controls not maintained?**		**Controls not provided?**	

6. Immediate Safety Actions Taken To Safeguard the Site or Control the Situation

Action	Action By	Action Date

7. Reporting

The report must be completed by the Offshore Incident Command (see *MOR-010*) or a competent and impartial witness.

Declaration:
This report is a true and factual account of the incident

Signature of Report Author _____ **Date** _____

Please send the completed form to the Wave Hub Duty Manager within 24hrs: duty.manager@wavehub.co.uk **Mobile: 07818 573180**

8. Distribution

Operator's Management		**WHL Head of Operations**		**WHL Managing Director**		**WHL Electrical Engineer**		**Wave Hub Duty Manager**			
Vessel Master		**Others (*Please Specify*)**									

Hazard Identification / Near Miss / Major Technical Fault / Non-conformance Report

This form should be used to record and manage corrective and preventive actions in respect of any identified health, safety, technical, business or environmental non-conformance or hazard.

Originator's Name	Position / Company	Date	Report Number

Operator Concerned	Location Concerned	Equipment and/or Personnel Concerned

Hazard or Non-conformance Description / Causes *[Describe the hazard and/or non-conformance; ensure the applicable requirements, procedures, specifications, drawings, serial numbers, etc. are noted.]*

Incident Date / Time	Hazard / Non-conformance	Identified Cause(s)

Risk Assessment of Identified Hazard or Non-conformance (*see the WHL Risk Matrix below for scoring information*)

Consequence Assessment	Probability	Severity	Risk Score	Risk Rating
People				
Equipment				
Environment				
Business				

Immediate Actions Taken and Notices Issued (*unsafe activities must be stopped immediately*)

Date / Time	Action Taken	By Whom

Planned Investigation / Corrective / Preventive Actions

Planned Corrective / Preventive Actions to be agreed with WHL *[Describe for each issue, the actions required to restore safe working and/or working to specified requirements. The necessary information must be disseminated to all involved before the action is closed. Consideration shall be given to all related aspects such as equipment replacement, process improvement, procedure revision, training, competency etc.]*

Issue	Proposed Action	By Whom	Target Date	Close Date

Operator's Director Approval of Corrective / Preventive Actions

_____

Signature *Date*

Closing the Corrective Action Plan

Operator's Director Acceptance of Completed Corrective / Preventive Actions

[*conditions for safe working restored (risks = ALARP) and/or working to specified requirements reestablished and evidenced*]

_____ ***Where suspended, works may resume on the tasks affected.***

Signature *Date*

WHL Risk Matrix:

Severity Rating	Consequence Descriptors				Probability Rating			
	Personnel	Environment	Assets	Reputation and Business	Remote (1) Could Occur Not Likely	Unlikely (2) Has Occurred	Likely (3) Easy to Postulate	Frequent (4) Occurs Regularly
Extensive (4)	Fatality	Major Local Effect Restoration Time > 1 Year Cost > £1M	Loss of Major Asset > £1M	Severe Damage to Business > £1M	4	8	12	16
Severe (3)	Major Injury	Restoration Time < 1 Year Cost < £1M	Damage to Major Asset < £1M	Large Loss < £1M	3	6	9	12
Moderate (2)	Lost Time Injury > 7 Days	Restoration Time < 1 Month Cost < £500K	Repairable Damage < £500K	Medium Loss < £500K	2	4	6	8
Minor (1)	First Aid Only / Illness	Restoration Time < 1 Week Cost < £10K	Minor Damage < £10K	Small Loss < £10K	1	2	3	4
High Risk	Undesirable risk, tolerable only if further risk reduction is impracticable or if the costs are grossly disproportionate to the improvement gained. The operation shall not commence without further detailed assessment and formal dispensation by the Managing Director.							
Medium Risk	Tolerable risk if the cost of risk reduction would exceed the improvement gained. The operation can be executed provided that all assessed mitigation measures and controls are implemented and actively managed.							
Low Risk	Acceptable risk. The operation can be executed subject to the mitigation measures and controls identified.							

Offshore Site Access Log - For Wave Hub Duty Manager / MCA CGOC Reference in Emergencies

***Procedure - see MOR-009 for details.** To be used _only_ where necessary in place of OPANS.*

KEY WHL CONTACTS:

Wave Hub Duty Manager (24/7) - Email: duty.manager@wavehub.co.uk / Mobile: 07818 573 180

WHL Head of Operations - Email: julius.besterman@wavehub.co.uk / Mobile: 07918 630 852

Document Title	Date	Revision No	Issued By	Approved by
Form M010 Offshore Site Access Log	21-09-2017	11	JB	CG

Name of Permitted Operator:

Access Notification *(required at least 12hrs prior to planned site access)*													**Access Report** *(required within 2hrs of departure from site)*				
Operation Title	**Permit Number**	**Planned Start of Site Access *Date/Time***	**Expected Access Duration *(days/hrs)***	**Worksite and Safety Clearance Requested (*m*)**	**Vessel Name** *(use a new line for each vessel utilised)*	**Operating Port / Refuge**	**Activities Planned and Risk Assessed?**	**Onshore Duty Manager**	**Onshore Duty Manager Mobile**	**Offshore Operations Manager**	**Offshore Operations Manager Mobile**		**Start of Site Access *Date/Time***	**Depature from Site *Date/Time***	**Overall Operation Progress (%)**	**Accidents / Incidents / Near-Misses / Hazards / Faults/ Non-Conformances to Report *(Full report in 24 Hrs)***	**Commentary** ***(Summary of work completed. All key co-ordinates should be provided - WGS84 lat/long in degrees / minutes + 3dp of minutes)***

WHL Offshore Visitor Form (*WHL Internal Use Only*)	
Name of visitor	
Name of employer or NOK	
Employer or NOK contact details	
Purpose of visit	
Date of visit	
Certifications supplied	**Medical Certificate** **Yes / No** **Personal Survival Techniques (PST)** **Yes / No**
Name of qualified escort (*where no PST supplied*)	***For a medical exemption only - no dedicated escort is required****
Escort to sign and date: (*see responsibilities below*)	**…… Date ……**
If application is for access without medical certificate	***'I am fit and my general health is good and there are no reasons why I should not go offshore.'***
Visitor to sign and date declaration:	**…… Date ……**
Remarks / previous experience / other relevant information	
Access granted by WHL Head of Operations	**Yes / No**
Any restrictions applied	
Reason for rejection	
Signed Approval by WHL Head of Operations:	**…… Date ……**
A safety briefing and vessel induction must be attended by all personnel before departure. Whilst on board, all instructions from the vessel master must be followed.	

Guidelines on conditions for certificate exemptions:

1) *No valid personal survival techniques (PST) certificate (or equivalent)*

The following conditions shall be applied for personnel **not qualified** to work offshore:

- All such visitors shall first be trained and instructed in the correct donning and use of relevant PPE, Safety, and Lifesaving Equipment by a competent person
- All PPE and Safety Equipment shall be checked for such visitors by a competent person
- The named escort for the visitor (who has duly passed the STCW95 PST) is responsible for the visitor at all times and shall not leave the visitor at any stage of the offshore site access.
- All such visitors shall remain on board the transfer vessel (*no form of offshore transfer is allowed unless an emergency dictates otherwise*)

2) *No valid medical certificate*

The applicant must state and sign that he is fit for duty. A general healthy appearance of the applicant must also be ascertained by the WHL Head of Operations.

WHL Toolbox Talk Form (*WHL Internal Use Only*)	
Operation Title	
Date	
Scope of Work	
Site Location	
Vessel	
Expected Start Time	
Expected Duration (days/hours)	
Weather **Wind** **Swell** **Tide Times** **Water Temperature** **Air Temperature**	
RAMS Reference	
ERP Reference	MOR-020 WHL Marine Emergency Response Plan
Permit to Operate Reference	
Radio – VHF Working Channel	Dual Watch 16 + 11 / 71 [*delete as applicable*]

Key Contacts	Name	Mobile Number
WHL Supervisor Offshore		
First Aider Offshore		
Duty Manager Ashore		
Vessel Master		

Toolbox Talk Checklist

[*tick where applicable*]

Vessel Induction & Safety Equipment	☐	Fire and Emergency Response Arrangements	☐
RAMS	☐	Potential Hazards	☐
Site Access / Egress	☐	PPE and Equipment to be Used	☐
Responsibilities / Duty Holders	☐	Manual Handling	☐
Site Access / Egress	☐	Materials / Chemicals to be Used	☐
Work Environment	☐	Ashore Duty Manager Informed	☐

Toolbox Talk Aims

- Ensure working team and vessel master has a thorough understanding of the work plan
- Encourage active participation through open dialogue
- Ensure a safe and environmentally considerate working environment

Participants List

It is compulsory that all personnel on board a vessel planning to access the Wave Hub offshore site shall attend the toolbox talk. All personnel on board must sign to confirm attendance and a thorough understanding of all the documentation referenced and information presented before departure is permitted.

Name *(Block Capitals)*	Company	Position	Date	Signature

The works have been safely planned and personnel briefed according to the requirements of the OMS and the current weather conditions and forecast are favourable.

WHL Offshore Supervisor (*signature*): …… Date: ……

Vessel Master (*signature*): …… Date: ……

WHL Risk Assessment and Method Statement (RAMS) Template (*WHL Internal Use Only*)

Operation Title:		**Permit Reference:**	
Vessel / Offshore Site / Port		**Prepared By (*Competent Person*):**	
Scope of Work:		**Date of Assessment:**	
		Is the Total Risk Acceptable?	**Yes / No**

Required Personal Protective Equipment (see *MOR-014*):

☐ *Hardhat* ☐ *Safety Glasses* ☐ *Gloves* ☐ *Fall Protection / Safety Lines* ☐ *High Vis Work Vest* ☐ *Ear Protection*
☐ *PLB* ☐ *Portable VHF* ☐ *Gas Meter* ☐ *Ear / Hearing Protection* ☐ *Respiratory Protection* ☐ *Lifejacket*
☐ *Immersion Suit* ☐ *Sun Protection* ☐ *Face Shield* ☐ *Wet Weather / Thermal Clothing* ☐ *Waterproof Safety Shoes / Boots*
☐ ***Additional PPE or Further PPE Specifications:***

Task No.	Work Tasks in Sequence (*show HOLD points*)	Hazards	Potential Consequences	Risk Reducing Precautions / Controls	Residual Risk Rating*			Responsible Person
					Prob.	Sev.	Score	
1								
2								
3								

Task No.	Work Tasks in Sequence (*show HOLD points*)	Hazards	Potential Consequences	Risk Reducing Precautions / Controls	Residual Risk Rating*			Responsible Person
					Prob.	Sev.	Score	
APPROVAL: WHL Competent Works Supervisor								
			Name:			Date:		
			Signature:					

**Works may only continue as planned for Tasks with Low and Medium Residual Risk Scores. A Task with a Residual High-Risk Score will require more detailed assessment and WHL Managing Director approval. The WHL Risk Assessment Scoring Matrix is presented below.*

WHL RISK ASSESSMENT MATRIX

Severity Rating	Consequence Descriptors				Probability Rating			
	Personnel	Environment	Assets	Reputation and Business	Remote (1) Could Occur Not Likely	Unlikely (2) Has Occurred	Likely (3) Easy to Postulate	Frequent (4) Occurs Regularly
Extensive (4)	Fatality	Major Local Effect Restoration Time > 1 Year Cost > £1M	Loss of Major Asset > £1M	Severe Damage to Business > £1M	**4**	**8**	**12**	**16**
Severe (3)	Major Injury	Restoration Time < 1 Year Cost < £1M	Damage to Major Asset < £1M	Large Loss < £1M	**3**	**6**	**9**	**12**
Moderate (2)	Lost Time Injury > 7 Days	Restoration Time < 1 Month Cost < £500K	Repairable Damage < £500K	Medium Loss < £500K	**2**	**4**	**6**	**8**
Minor (1)	First Aid Only / Illness	Restoration Time < 1 Week Cost < £10K	Minor Damage < £10K	Small Loss < £10K	**1**	**2**	**3**	**4**
High Risk	Undesirable risk, tolerable only if further risk reduction is impracticable or if the costs are grossly disproportionate to the improvement gained. The operation shall not commence without further detailed assessment and formal dispensation by the Managing Director.							
Medium Risk	Tolerable risk if the cost of risk reduction would exceed the improvement gained. The operation can be executed provided that all assessed mitigation measures and controls are implemented and actively managed.							
Low Risk	Acceptable risk. The operation can be executed subject to the mitigation measures and controls identified.							

Developer Permit To Operate			Permit Number: 0	
Permit Start:	Date		Time	
Permit Expires:	Date		Time	
Permit Issued To (the "Developer"):				

This permit should be used for a "Developer" under-leasing a site within the Wave Hub "Renewable Energy Development Area" for "Device" deployment (implying singular or multiple renewable energy devices and all associated offshore infrastructure) and associated operations support.
The permit requirements should be reviewed and documentation refreshed at least annually.

Overview of Project Objectives

Device, moorings, cable routes, under-leased site boundary and transit gate coordinates

- ***All positions to be quoted in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes***
- ***A chart should be prepared and attached where possible***

Outline specification / description of the Device

- ***Pictures or drawings of equipment should be attached where available***

Import capacity applied for: **kW**
Export capacity applied for: **kW**

Outline project programme

Installation:
Device Deployment:
Decommissioning:

Weather limits to be applied to O&M and ERP activities:

Safe clearances, Device marking, aids to navigation and safety notes for mariners and other permitted site operators

Key Developer Contact Details

Developer Operations Manager:
Mobile:
Email:
Developer Onshore Duty Phone (24hrs):

O&M and ERP Vessel Details:

Vessel Name:				
Vessel Type / LOA(m):				
Vessel Function:				
VHF Call Sign:				
MMSI:				
Vessel Operator Duty Phone:				
Vessel Operator Email:				
Usual Operating Port:				

Conditions

Site Access Procedures and Limitations Apply as detailed in MOR-008 and MOR-009.
OPANS must be used to notify other users of Operations (where unavailable FORM-M010 may be used).
A further Permit for Special Operations (*including for Device Deployment*) is required as detailed in Form-M016.

Key WHL Contacts

Wave Hub Duty Manager: Email: duty.manager@wavehub.co.uk, **Mobile: 07818 573180**
(*Duty Phone is available for emergency communications 24/7*).
WHL Managing Director: Claire Gibson, Email: claire.gibson@wavehub.co.uk (Mobile: 07712 678884)
WHL Head of Operations: Julius Besterman, Email: julius.besterman@wavehub.co.uk (Mobile: 07918 630852)
WHL Hayle Office: 01736 800290

Permit to Operate authorised by WHL on the terms set out herein

Wave Hub Limited	**Signature**		**Name**	
	Position		**Date/Time**	

Permit to Operate accepted on the terms set out herein

The Developer:	**Signature**		**Name**	
……	**Position**		**Date/Time**	

Before any operations commence, copies of this Permit to Operate must be posted as follows:

1) WHL Office	2) Developer's Project Office	3) On The Bridge Of All Vessels Used

Permit Variations, Time Extensions and Completion of Reviews

Review, Permit Variation or Permit Extension Endorsement	Change to Validity

In consideration of the "Developer" agreeing to act in accordance with the terms and conditions set out herein, WHL hereby grants to the "Developer" this Permit to Operate.

It is understood that any deviation from agreed requirements, plans and procedures renders this permit automatically invalid.

Permit conditions may be varied at any time by WHL.

Permit Requirements				
Permit Requirement / Compliance	**Reference**	**Validated By**	**Applicable (Y/N)**	**Document Reference / Comments**
Signed Contract	Berthing Agreement	WHL		Permit subject to signed Berthing Agreement valid to …..
Developer Insurances	Berthing Agreement	WHL		Permit validity contingent on the required insurances being maintained for the duration of the infrastructure deployment: **Testing all risks £…. limit** **Public liability £25m limit** *WHL to be named / assured on the above insurances.*
Marine Licence	MMO Marine Licence Issued	WHL/MMO		Permit validity contingent on the Developer satisfying all conditions of Marine Licence **L/**……..
Developer Safety Management System (SMS)	MOR-021-Roles and Responsibilities Overview MOR-016-Developer Safety Management Requirements PLAN-001 Active Safety Management System PLAN-002 Wave Hub ERCoP – Outline Project Phase Information	WHL		
Detailed O&M Plans and ERP	MOR-007-Device Support Operations MOR-010-Emergency Response Requirements MOR-026-Operational Switching and Offshore Working	WHL		
System Engineering Review	Technical Third-Party Validation of Structural System: MOR-002-Device and Mooring Design Electrical Detailed Design Review: Connection Specification Grid Stability Study: DNO Accepted Independent Model	WHL		
O&M and ERP Vessels	MOR-004-Vessels and Manning OPANS User Guide	WHL		List: Vessel Name / Type / Project Function *WHL to be named / assured on any primary project vessel P&I insurance.* *Vessel information must be accurately entered and maintained in OPANS.* *Vessel Safety Management Certification, Insurances, and Master's Competency Certification must be in date and validated by WHL before a vessel may be utilised.*
Build Compliance	Pre-Deployment Inspections and Checks: • Structural System (TPV) • Electrical Systems (Connection Specification) • SCADA Interface Trials	WHL		

This permit shall not be deemed or considered as confirming the sea-worthiness of the vessels named above.

By countersigning this Permit to Operate, the Developer agrees on behalf of itself and its agents, contractors, employees and invitees:

(i) not to access the Wave Hub "Renewable Energy Development Area" (as charted by the UKHO) nor carry out any related offshore operations without first fulfilling all requirements identified above, in any later variations or extensions, or in any associated Permit for Special Operations;

(ii) to fully comply with the terms and conditions of this Permit to Operate, including any documents referred to herein;

(iii) without prejudice to the terms of this Permit to Operate, to act in accordance with good industry practice when accessing the Wave Hub "Renewable Energy Development Area" and/or carrying out any operations therein; and

(iv) to indemnify WHL against all actions, claims, costs, charges, losses, liabilities (including third party liabilities) and expenses (including administrative expenses) caused to or incurred by WHL pursuant to a breach by the permit holder (whether directly or via its agents, contractors, employees and invitees) of the terms of this Permit to Operate (including any documents referred to herein).

Contractor Permit To Operate				Permit Number: 0
Permit Start:	Date		Time	
Permit Expires:	Date		Time	
Permit Issued To (the "Contractor"):				

This permit should be used for any controlled operations on the Wave Hub Offshore Site. Operations may be contracted either by WHL or by a Developer (prior to issue of a Developer Permit to Operate).
The permit requirements should be fully reviewed and documentation refreshed annually for long term contracts.

Overview of Operation Objectives

Infrastructure locations, working area boundary, and access arrangements

- ***All positions to be supplied in WGS84: latitude /longitude, in degrees, minutes & 3 decimal places of minutes***
- ***A chart should be prepared and attached where possible***

Outline programme of works

Projected works start and duration:

Weather limits to be applied:

Safe clearances, navigational safety features and safety notes for mariners and other permitted operators

Key Contractor Contact Details

Operations Manager:
Mobile:
Email:
Contractor Onshore Duty Phone (24hrs):

Vessel Details:

Vessel Name:		
Vessel Type / LOA(m):		
Vessel Function:		
VHF Call Sign:		
MMSI:		
Vessel Phone:		
Vessel Email:		
Master's Name:		
Vessel Operator Duty Phone:		
Vessel Operator Email:		
Works Operating Port / Anchorage:		

Key WHL Contacts

Wave Hub Duty Manager: Email: duty.manager@wavehub.co.uk, **Mobile: 07818 573180**
(*Duty Phone is available for emergency communications 24/7*).
WHL Managing Director: Claire Gibson, Email: claire.gibson@wavehub.co.uk (Mobile: 07712 678884)
WHL Head of Operations: Julius Besterman, Email: julius.besterman@wavehub.co.uk (Mobile: 07918 630852)
WHL Hayle Office: 01736 800290

Conditions

Site Access Procedures and Limitations Apply as detailed in MOR-008 and MOR-009.
OPANS must be used to notify other users of Operations (where unavailable FORM-M010 may be used).
Changes must be agreed through Contract Variations Forms (see FORM-M005) and the alteration endorsed below.

Permit to Operate authorised by WHL on the terms set out herein

Wave Hub Limited	**Signature**		**Name**	
	Position		**Date/Time**	

Permit to Operate accepted on the terms set out herein

The "Contractor":	**Signature**		**Name**	
……..	**Position**		**Date/Time**	

Before any operations commence, copies of this Permit to Operate must be posted as follows:

1) WHL Office	**2) Contractor's Project Office**	**3) On The Bridge Of All Vessels Used**

Permit Variations, Time Extensions and Completion of Annual Reviews

Annual Review, Permit Variation or Permit Extension Endorsement	Change to Validity

In consideration of the "Contractor" agreeing to act in accordance with the terms and conditions set out herein, WHL hereby grants to the "Contractor" this Permit to Operate.

It is understood that any deviation from agreed requirements, plans and procedures renders this permit automatically invalid.

Permit conditions may be varied at any time by WHL.

Permit Requirements				
Permit Requirement / Compliance	**Reference**	**Validated By:**	**Applicable (Y/N)**	**Document Reference / Comments**
Signed Contract	*Works Contract*	WHL		
Contractor Insurances	*Employers Liability Insurance specifically including coverage of the specified operations.* *Third Party Liability and Professional Indemnity Insurance sufficient to protect any assets at risk.*	WHL		
Marine Licence	*MMO Marine Licence Conditions*	MMO		Permit validity contingent on the Contractor satisfying all conditions of Marine Licence L/……..
Contractor HSEQ Management	*MOR-021 Roles and Responsibilities Overview* *MOR-017 Contractor Safety Management Requirements* *FORM-M001 WHL Contractor HSEQ Questionnaire*	WHL		
Detailed Operations Planning: • **Works RAMS** • **HIRA** • **Engineering** • **ERP**	*MOR-013 Offshore Contractor Operations Management* *MOR-003 Wave Hub Cable and Connector Handling* *MOR-011 Diving and ROV Operations* *MOR-023 Geotechnical Investigation and Subsea Drilling* *MOR-024 Wave Hub Aids to Navigation Maintenance* *EOR-001 Offshore Works - Cable Testing and Electrical Permit Issue Requirements*	WHL		
Marine Operations Safety Compliance	*MOR-008 Offshore Site Safety* *MOR-009 Offshore Site Access Procedures* *MOR-012 Notice to Mariners* *PLAN-002 Wave Hub ERCoP* *OPANS User Guide*	WHL		
Electrical Safety and Testing Compliance	*EOR-001 Offshore Works - Cable Testing and Electrical Permit Issue Requirements*	WHL		*Where any interaction with Wave Hub cable system is planned*
Vessel Safety Compliance	*MOR-004 General Purpose Vessels and Manning* *MOR-005 Moored Vessels or Platforms* *MOR-006 Dynamic Positioning Vessels*	WHL		Vessel Name / Function: Vessel Master: Vessel Master Certification: Vessel Registration Certificate: Vessel Safety Certification: Vessel Class Certificate: Vessel Insurance Certificate:

This permit shall not be deemed or considered as confirming the sea-worthiness of the vessels named above.

By countersigning this Permit to Operate, the "Contractor" agrees on behalf of itself and its agents, sub-contractors, employees and invitees:

(i) not to access the Wave Hub offshore site (defined as the Wave Hub Renewable Energy Development Area, Safety Zone, Aids to Navigation, and the Subsea Power Cable Route to shore) nor carry out any related offshore operations without first fulfilling all requirements identified above or in any later variations or extensions;

(ii) to fully comply with the terms and conditions of this Permit to Operate, including any documents referred to herein;

(iii) without prejudice to the terms of this Permit to Operate, to act in accordance with good industry practice when accessing the Wave Hub offshore site and/or carrying out any operations therein; and

(iv) to indemnify WHL against all actions, claims, costs, charges, losses, liabilities (including third party liabilities) and expenses (including administrative expenses) caused to or incurred by WHL pursuant to a breach by the permit holder (whether directly or via its agents, sub-contractors, employees and invitees) of the terms of this Permit to Operate (including any documents referred to herein).

Wave Hub

Developer Permit for Special Operations			Permit Number: 0	
Permit Starts	Date		Time	
Permit Expires	Date		Time	
Permit Issued To (*the "Developer"*):				
Overview of Operation Objectives				
Operation Type (*please select best-fit from the drop-down menu - definitions are provided on the back of the permit - only one operation category per permit)*				

Key Developer Contact Details	
Developer Operations Manager:	
Mobile:	
Email:	
Onshore Duty Phone (24hrs):	
Developer SAP:	
Mobile:	
Email:	

Vessel Names:			
Vessel Type / Function / LOA(m):			
VHF Call Sign:			
MMSI:			
Vessel Phone:			
Vessel Email:			
Master's Name:			
Vessel Operator Duty Phone:			
Vessel Operator Email:			
Works Operating Port / Anchorage:			

Key WHL Contacts			
Role	Name	Email	Tel
Wave Hub Duty Manager	Rotating - Available 24/7	duty.manager@wavehub.co.uk	07818 573 180
WHL Managing Director	Claire Gibson	claire.gibson@wavehub.co.uk	07712 678 884
WHL Head of Operations	Julius Besterman	julius.besterman@wavehub.co.uk	07918 630 852

Period of projected works (a project programme should be attached where available)	
Projected works start and duration:	
Weather limits to be applied:	

Minimum vessel safe clearances and key operation safety notes for mariners and other permitted operators

Notes and Additional Conditions
Site Access Procedures and Limitations Apply as detailed in MOR-009 and MOR-008. OPANS must be used.

Special Operation authorised by WHL				
Wave Hub Limited	Signature		Name	
	Position		Date/Time	

Special Operation accepted on the terms set out herein by the "Developer				
The "Developer"	Signature		Name	
.....	Position		Date/Time	

Before operations commence copies of this Permit must be posted alongside the applicable PTO as follows:		
1) WHL Office	2) Developer's Project Office	3) On The Bridge Of All Vessels Used

Permit Variation or Extension	
Permit Variation or Extension Endorsement	Change to Validity

In consideration of the Developer agreeing to act in accordance with the terms and conditions set out herein, WHL hereby grants to the Developer this Permit for Special Operations.

It is understood that any deviation from agreed plans and procedures renders this permit automatically invalid.

Permit conditions may be varied at any time by WHL.

Wave Hub

Permit Requirements				
Permit Requirement / Compliance	**Reference**	**Validated By**	**Applicable**	**Document Reference / Comments**
MMO Marine Licence	MMO Marine License Conditions	MMO		Permit validity contingent on the Developer satisfying all conditions and notification requirements of Marine Licence L/……..
Detailed Operations Planning Including, as Appropriate to the Scope of Work: **- Marine RAMS** **- HIRA / HAZOP** **- Detailed Engineering** **- Electrical / Test Plan** **- Dive Plan** **- Contingency Plans** **- ERP**	MOR-001-Device Installation or Decommissioning MOR-003-Wave Hub Cable and Connector Handling MOR-010-Emergency Response Requirements MOR-011-Diving and ROV Operations MOR-022-Device Deployment and Physical Connection MOR-025-Device Removal and Physical Disconnection MOR-026-Operational Switching and Offshore Working	WHL		
Marine Operations Safety Compliance	MOR-008-Offshore Site Safety MOR-009-Offshore Site Access MOR-012-Notice to Mariners PLAN-002 Wave Hub ERCoP (*Update*) OPANS User Guide	WHL		
Vessels, Equipment and Personnel Compliance	**Vessel Checks:** MOR-004-General Purpose Vessels and Manning MOR-005-Moored Vessels or Platforms MOR-006-Dynamic Positioning Vessels **Cable Handling Survey *(if applicable):*** MOR-003-Wave Hub Cable and Connector Handling *(WHL Representative to be Accommodated During Works)* **Diving Compliance Checks *(if applicable):*** MOR-011-Diving and ROV Operations	WHL		*This permit shall not be deemed or considered as confirming the sea-worthiness of the vessels named above.*
Electrical Safety Management and Testing Compliance	**Electrical Safety and Testing Management Processes, Personnel Competency and Communications Checks:** MOR-022-Device Deployment and Physical Connection *(Including WHL Witnessing of Developer Cable + Half DMC Integrity Tests Onshore Pre-Load-Out)* MOR-025-Device Removal and Physical Disconnection MOR-026-Operational Switching and Offshore Working	WHL		
Location	**Worksite Definition:** Coordinates In WGS84: Latitude / Longitude (*in degrees, minutes & 3 decimal places of minutes*)	WHL/MMO		
Wave Hub / OPANS Advanced Operation Notification Required				

***Major Device Maintenance or Alterations** must be covered by the existing Grid Stability Study, Electrical Systems Detailed Design Review, Structural Systems Third Party Validation Report and observe that which is specified and agreed in the Berthing Agreement and MMO Marine Licence. Where specification changes exceed any previously agreed parameter or condition, then further tests and studies (to be agreed with WHL and the MMO) must be completed and the Permit to Operate varied before a Permit for Special Operations can be issued.*

By countersigning this Permit for Special Operations, the Developer agrees on behalf of itself and its agents, contractors, employees and invitees:

(i) not to access the Wave Hub "Renewable Energy Development Area" (as charted by the UKHO) nor carry out any related offshore operations without first fulfilling all requirements identified above;

(ii) to fully comply with the terms and conditions of this Permit for Special Operations, including any documents referred to herein;

(iii) without prejudice to the terms of this Permit for Special Operations, to act in accordance with good industry practice when accessing the Wave Hub "Renewable Energy Development Area" and/or carrying out any operations therein; and

(iv) to indemnify WHL against all actions, claims, costs, charges, losses, liabilities (including third party liabilities) and expenses (including administrative expenses) caused to or incurred by WHL pursuant to a breach by the permit holder (whether directly or via its agents, contractors, employees and invitees) of the terms of this Permit for Special Operations (including any documents referred to herein).

Definitions	
Device Deployment	All work connected with deployment of a validated Developer Device and associated offshore infrastructure. *(Scope of work is limited only by availability of finalised and validated operations plans. Multiple permits may be issued to cover phased projects. The permit will include authorisation to handle Wave Hub Subsea Cables and Connectors upon validation and acceptance of these specialised plans.)*
Major Device Maintenance or Alteration	Temporary equipment removal or replacement and any major maintenance, repairs, upgrade or changes made to the installed Device and associated offshore infrastructure during the Device O&M phase. *(The application of a Permit for Special Operations will always be at the discretion of WHL. Regularly repeated major operations may ultimately be exempted from this permit after being well planned and safely completed at least three times successively - the operation may then be specified and endorsed on the main Permit to Operate and safety monitored as routine works - noting that any safety incident subsequently occurring may result in re-instatement of tighter controls once again. Works that include specialist handling of Wave Hub Subsea Cables and Connectors must always be authorised through a Permit for Special Operations. Specifications must remain within the parameters of the approved Structural System Third Party Validation, Electrical System Detailed Design Review and associated Grid Stability Study.)*
Diving Operations	Any Developer diving work in connection with the Device and associated offshore infrastructure. (*Developer works that include diving must always be authorised through a Permit for Special Operations inclusive of this high risk activity. Diving may be included as an activity under any of the Operation Types listed here. The Diving Operations category is included for cases where diving is the sole activity.)*
Device Decommissioning	Partial or full decommissioning of Device and associated offshore infrastructure. (P*ermanent rather than temporary removal. The permit will include authorisation to handle Wave Hub Subsea Cables and Connectors upon validation and acceptance of these specialised plans.*)

WHL Notice to Mariner Contacts

CONFIDENTIAL

Wave Hub

Document Title	Date	Revision No	Issued By	Approved by
Form M019 Notice to Mariner Contact Schedule	19-09-2017	12	JB	CG

Live contact database to be filed at: Box Sync\Shared\OMS\FINAL OMS\Marine Safety System\Marine Operation Permits and Logs - LIVE

Name	Organisation	Function	Included	Email	Phone	Contact Checked
Fisheries						
Harbour Authorities						
Navigation Safety Organisations						
Consenting Organisations						
Research Organisations						
Active Permitted Contractors						
Active Permitted Developers						