LAMINARIA

Deployment of a Shallow Water Wave Energy Converter at the EMEC Billia Croo Test Site

Vessel Management Plan

April 2018

Contents

1 Introduction 3
1.1 Deployment location 3
2 Management and coordination of vessels 4
2.1 Location of base ports 4
2.2 Transportation phase 4
2.3 Installation phase 5
2.4 Operational and maintenance phase 5
3 Number of vessels 6
4 Transition routes 7
5 Potential Environmental Impacts 7

1 Introduction

Laminaria is planning to deploy their first full-scale Wave Energy Converter (WEC) at the European Marine Energy Centre's Billia Croo wave energy test site. This Vessel Management Plan (VMP) was developed to support the Marine Licence application. This document provides an overview of marine vessels required for the installation, operation and decommissioning of the device during the deployment period. Additionally, the document states the expected frequencies in which marine vessels will be present in the waters around the Billia Croo wave energy test site.

The deployment period of the 200 kW (rated power) WEC will start in the beginning of August 2018 and will end with the decommissioning of the Laminaria WEC in September 2019. A marine licence for 18 months will be applied for to allow for contingency in the project schedule.

1.1 Deployment location

The Laminaria WEC will be installed at berth two of the Billia Croo test site. Table 1 indicates the area of the test site which is marked by cardinal buoys as well as the location of berth two. Table 2 indicates the proposed boundary coordinates of the Laminaria WEC deployment area.

Table 1: Billia Croo navigational cardinal buoy and berth two location

Location	Latitude	Longitude
North cardinal buoy	59° 00.000'N	003° 24.330'W
West cardinal buoy (1)	58° 58.529'N	003° 24.638'W
West cardinal buoy (2)	58° 59.500'N	003° 25.330'W
South cardinal buoy	58° 57.431'N	003° 23.028'W
East cardinal buoy	58° 58.386'N	003° 22.399'W
Berth 2	58° 58.586'N	003° 23.335'W

Table 2: Laminaria proposed licence boundary coordinates

Location	Latitude	Longitude
North west corner	58° 58.753'N	003° 23.354'W
North east corner	58° 58.592'N	003° 22.928'W
South west corner	58° 58.444'N	003° 23.358'W
South east corner	58° 58.598'N	003° 23.768'W

In case of significant changes of the VMP, Laminaria will communicate changes to the Marine Scotland Licencing and Operations Team (MS-LOT) immediately and update the VMP for clarification if requested. Further approval of the re-drafted VMP will be obtained before the start of the deployment period.

2 Management and coordination of vessels

This part of the VMP includes the management and coordination of the marine vessels required during the deployment period at EMEC. The selection and contracting of the vessels will be primarily driven by market conditions, costs and vessel availability.

2.1 Location of base ports

There are two considerable ports close to the Billia Croo wave energy test site: the port of Stromness and the port of Lyness. There are higher levels of marine traffic in the mouth of Hoy Sound, with ferries to the mainland, fishing vessels, sailing boats and dive boats. The base port of Laminaria during the deployment period at EMEC will be the port of Lyness to avoid increased marine traffic close to Stromness. The marine vessels required for the installation, maintenance and decommissioning of the device will leave from the port of Kirkwall.

2.2 Transportation phase

The Laminaria WEC will be constructed and assembled in Zeebrugge (Belgium) and towed by a multi-cat vessel to the harbour of Lyness at the Orkney Islands. The marine operator of the marine vessels will be Leask Marine, which is based close to the port of Kirkwall. The multi-cat vessel will also be utilised for the installation, recovery and decommissioning of the WEC. Depending on the availability of the marine vessels, there are two multi-cat vessels which can be used during the deployment period of Laminaria at EMEC and their specifications are indicated in the following two tables:

Table 3: Detailed information about the multi-cat vessel for the towing of the WEC

Vessel Name	MV C-Fenna
Type of vessel	Neptune Eurocarrier 2611
Flag state	UK
Port of registration	Kirkwall
Year built	2013
Vessel International Maritime Organisation Number (IMO)	9675963
Official number	922340
Call sign	MBAH3
Vessel Owner	Leask Marine
Operating Company	Leask Marine
Length	26.48 m
Beam	11 m
Depth	3.5 m
Draught	2.61 m

Table 4: Detailed information about the multi-cat vessel for the towing of the WEC

Vessel Name	MV C-Odyssey
Type of vessel	Multiworker Twenty6
Flag state	UK
Port of registration	Kirkwall
Year built	2011
Vessel International Maritime Organisation Number (IMO)	9636307
Official number	917987
Call sign	2ETW7
Vessel Owner	Leask Marine
Operating Company	Leask Marine
Length	26 m
Beam	10.5 m
Depth	3.5 m
Draught	2.5 m

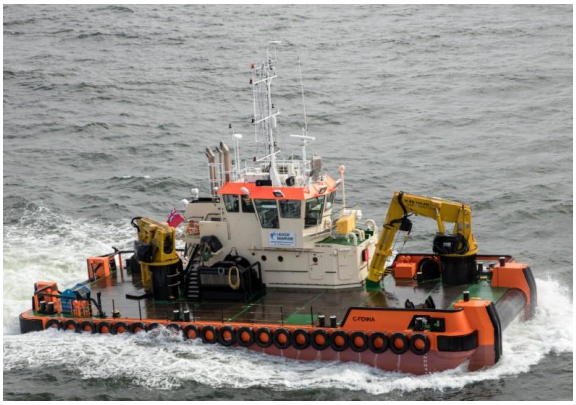


Figure 2: MV C-Fenna

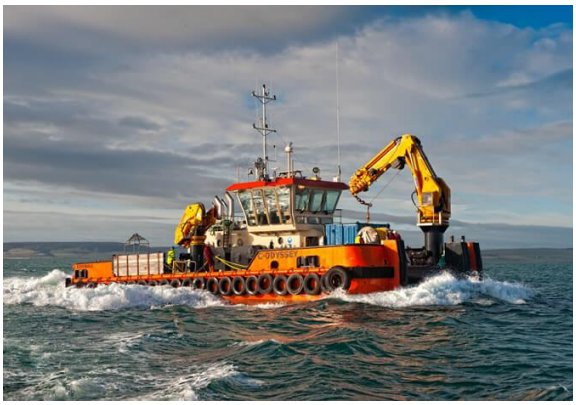


Figure 1: MV C-Odyssey

2.3 Installation phase

For the installation of the WEC, a multi-cat vessel and a small work vessel are required. The installation can be completed during one day. More information on the installation process of the Laminaria WEC can be found in the *Project Information Summary*. The same multi-cat vessel which will tow the WEC from Belgium to Scotland will be used for the installation process. Information can be found in Table 3 and Table 4 above.

2.4 Operational and maintenance phase

During the deployment period of the Laminaria WEC, no planned maintenance is scheduled. However, the device will be recovered several times to improve the installation method for future projects. The same vessel required for the installation of the WEC will be used. The recover process will be coordinated with the marine traffic

around the area of Billia Croo to decrease the risks of collision of marine vessels with the WEC and work vessels involved in the operation. More information regarding risks of the device to the marine traffic can be found in the *Device-Specific Addendum to the EMEC Wave Energy Test Site Navigation Risk Assessment* of Laminaria.

The decommissioning of the WEC will be in the reverse order of the installation process and additional to the multi-cat vessel, a small work vessel is required. The work vessel will be retrieving the marine air hose to surface the gravity base anchor. The utilisation of the work vessels will be depending on the availability at site. The following tables give an overview of the marine vessel details:

Table 5: Detailed information about the work vessel

Vessel Name	MV Uskmoor
Type of vessel	Workboat
Flag state	UK
Port of registration	Kirkwall
Year built	1984
Vessel International Maritime Organisation Number (IMO)	
Official number	
Call sign	
Vessel Owner	Leask Marine
Operating Company	Leask Marine
Length	16 m
Beam	5.5 m
Depth	
Draught	1.5 m

More information on the possible vessels to be used during the deployment period can be found in Annex 1 at the back of this document.

3 Number of vessels

Table 6 represents the indicative number of vessels required during the specific periods of transport, instalment, operation and decommissioning of the Laminaria WEC. The table also indicates the number of return trips which have to be conducted in order to fulfil the deployment requirements of the device. One return trip equates to the vessel transiting to the deployment site once and the return back to the port of Lyness. The indicated transits of the individual marine vessels will represent a best estimate based on the information available during the development of the VMP.

Table 6: Number of vessels required for the deployment period at EMEC

Vessel Type	Anticipated Total Number of vessels	Key Activities	Approximate Number of Return Journeys to Port
Multi-cat	1	WEC transport and assistance of installation / decommissioning	1
Work vessel	1	Assistance to submerge / surface the anchor of the WEC	1

4 Transition routes

The marine vessels of Laminaria will use indicated transit routes to keep the impacts on marine mammal and ornithological receptors to a minimum. The vessels may deviate from these transition routes in case of severe weather, tidal or sea state conditions. The vessels will be likely using the port of Lyness during the deployment period. The following table shows the transition routes from Belgium to the test site berth 2.

Table 7: Transition route information

Route Number	Origin Points	Main Purpose
1	Zeebrugge (BE) – Orkney (UK)	Transport of the Laminaria WEC from Belgium to Scotland
(2)	(Orkney – Port of Lyness)	
3	Port of Lyness – Berth 2 of EMEC	Transport of the WEC from the base port to the deployment site

The towing of the WEC from Belgium to the harbour of Lyness is not included in the marine licence. The towing through Belgian waters can be conducted without any licences or requirements. For the towing through Scottish waters, a load-line exemption, a tow warranty and a marine warranty are required, which will be obtained outside of the marine licence application.

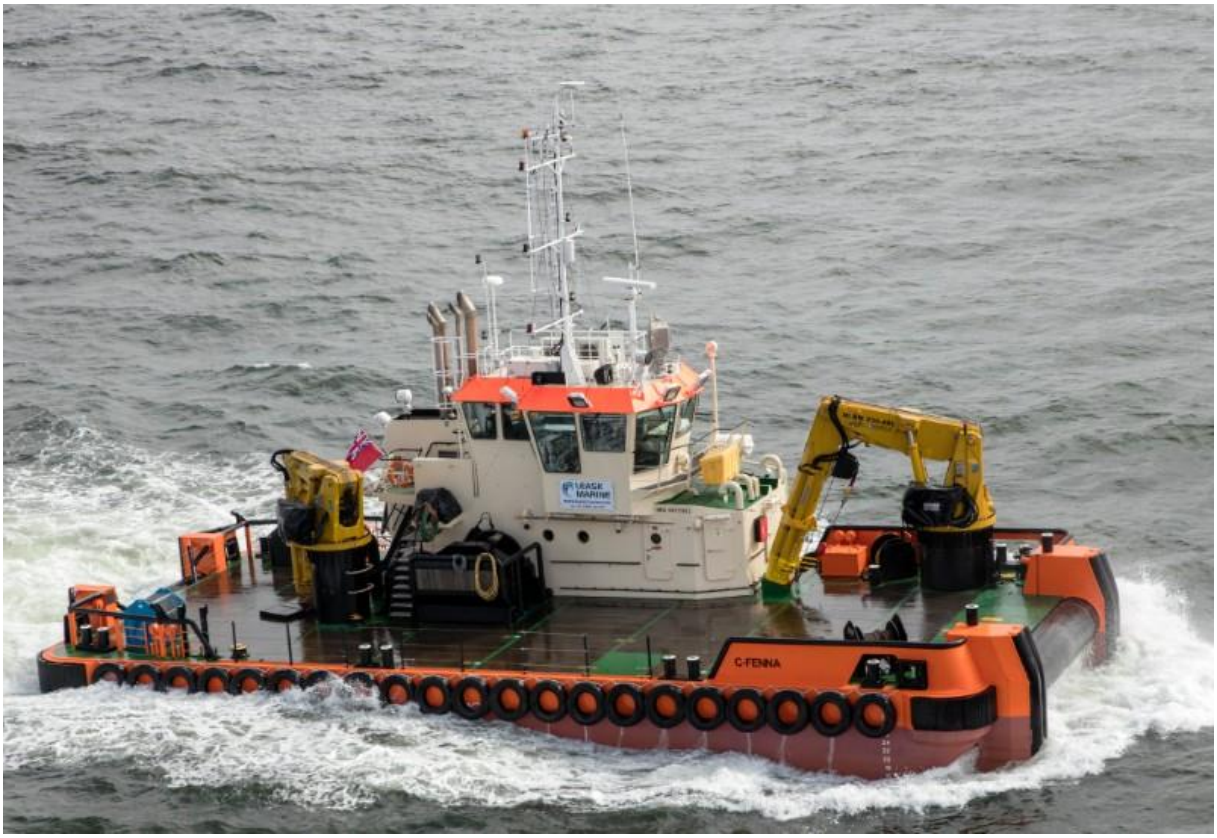
5 Potential Environmental Impacts

The use of marine vessels may have a potentially negative effect on marine wildlife close to the area. To minimise the potential environmental effects as much as possible, only two vessels will be used for the transport, installation, maintenance and decommissioning of the Laminaria WEC. Due to the design properties of the device and the anchor, Laminaria does not require to use devices with dynamic positioning facilities or larger vessels during these deployment stages and only a small work vessel and a multi-cat vessel are required. The marine vessels will use existing transition routes from the Zeebrugge harbour to the Orkney Islands and to the instalment location

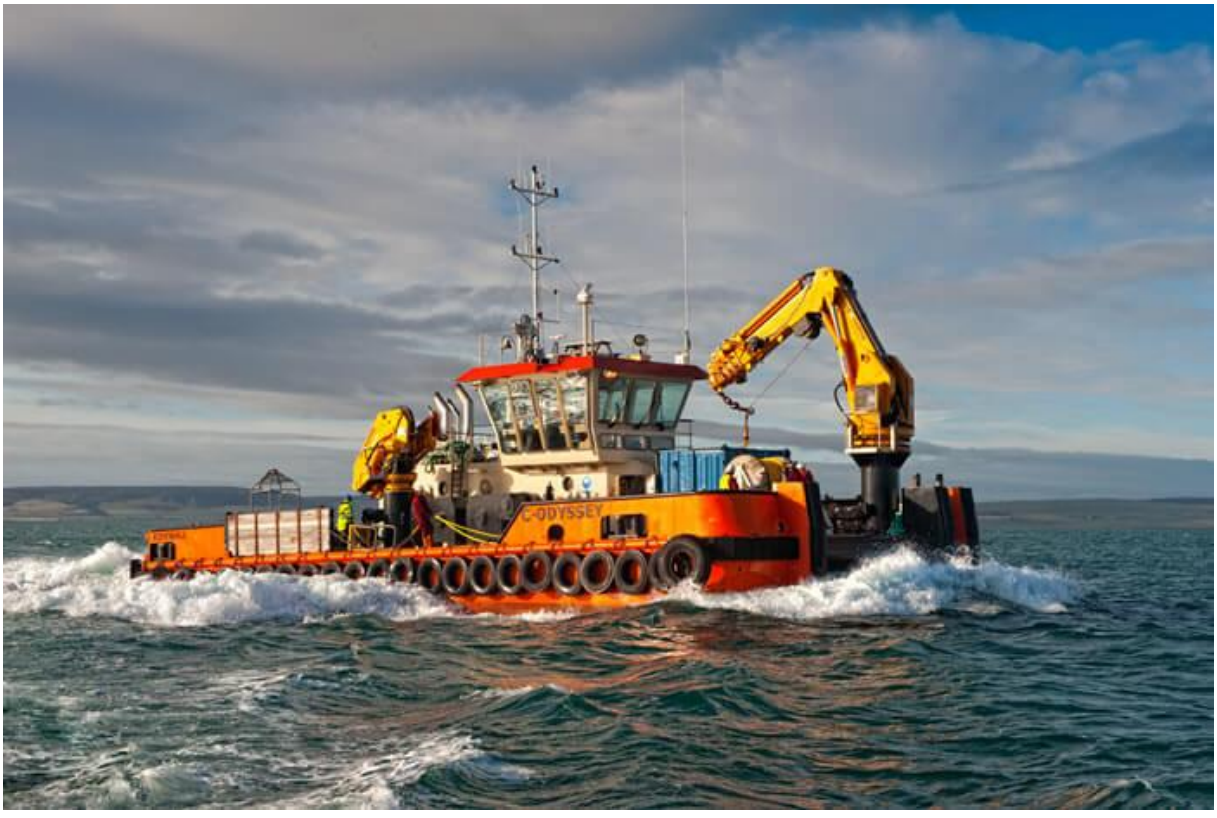
in berth two as much as possible. No planned maintenance is scheduled to keep the usage of the vessels to a minimum.

Annex one: Details of potential marine vessels to be used during the deployment period of the full-scale Laminaria WEC

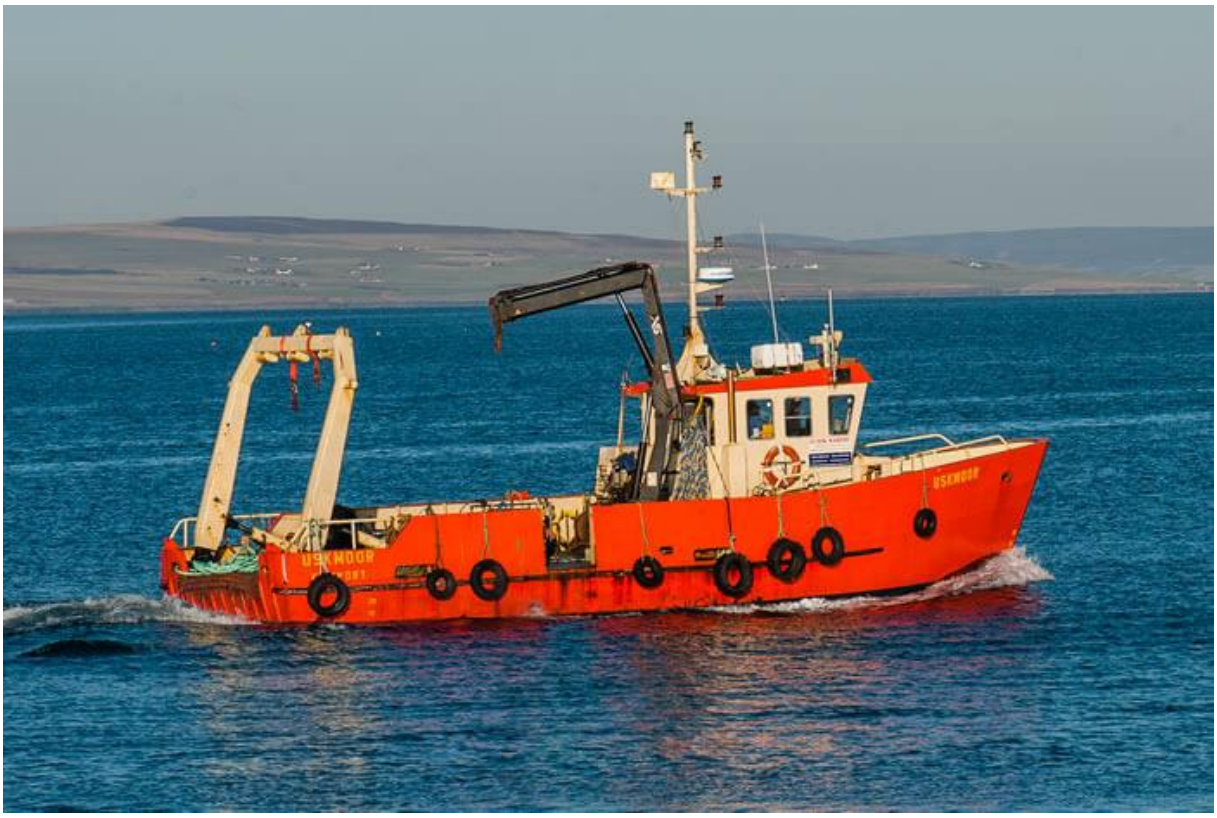
Leask Marine	
Vessel Name	MV C-Fenna
Type of vessel	Neptune Eurocarrier 2611
Flag state	UK
Port of registration	Kirkwall
Year built	2013
Vessel International Maritime Organisation Number (IMO)	9675963
Official number	922340
Call sign	MBAH3
Vessel Owner	Leask Marine
Operating Company	Leask Marine
Length	26.48 m
Beam	11 m
Depth	3.5 m
Draught	2.61 m



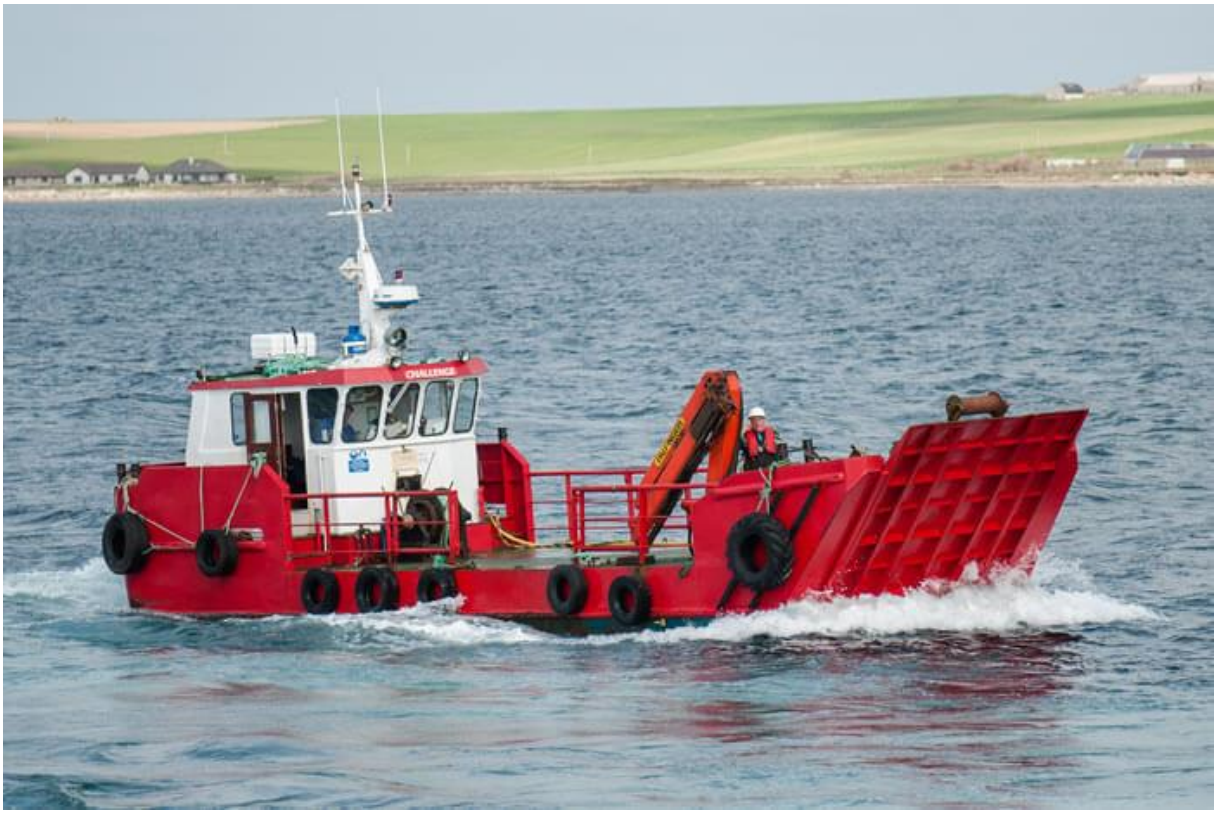
Leask Marine	
Vessel Name	MV C-Odyssey
Type of vessel	Multiworker Twenty6
Flag state	UK
Port of registration	Kirkwall
Year built	2011
Vessel International Maritime Organisation Number (IMO)	9636307
Official number	917987
Call sign	2ETW7
Vessel Owner	Leask Marine
Operating Company	Leask Marine
Length	26 m
Beam	10.5 m
Depth	3.5 m
Draught	2.5 m



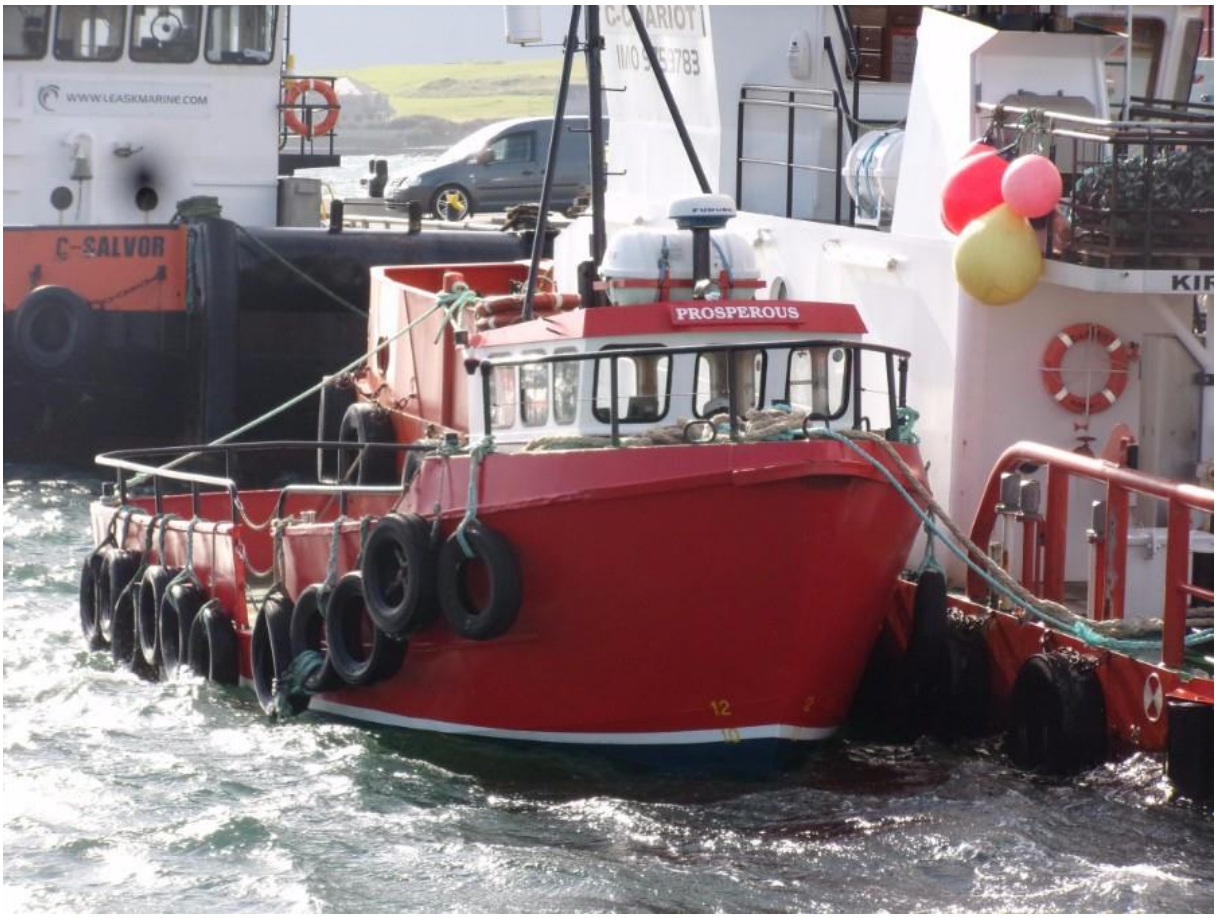
Leask Marine	
Vessel Name	MV Uskmoor
Type of vessel	Workboat
Flag state	UK
Port of registration	Kirkwall
Year built	1984
Vessel International Maritime Organisation Number (IMO)	
Official number	
Call sign	
Vessel Owner	Leask Marine
Operating Company	Leask Marine
Length	16 m
Beam	5.5 m
Draught	1.5 m



Leask Marine	
Vessel Name	MV Challenge
Type of vessel	Landing Craft
Flag state	UK
Port of registration	Kirkwall
Year built	1989
Vessel International Maritime Organisation Number (IMO)	
Official number	
Call sign	
Vessel Owner	Leask Marine
Operating Company	Leask Marine
Length	14.4 m
Beam	4.26 m
Draught	1.44 m



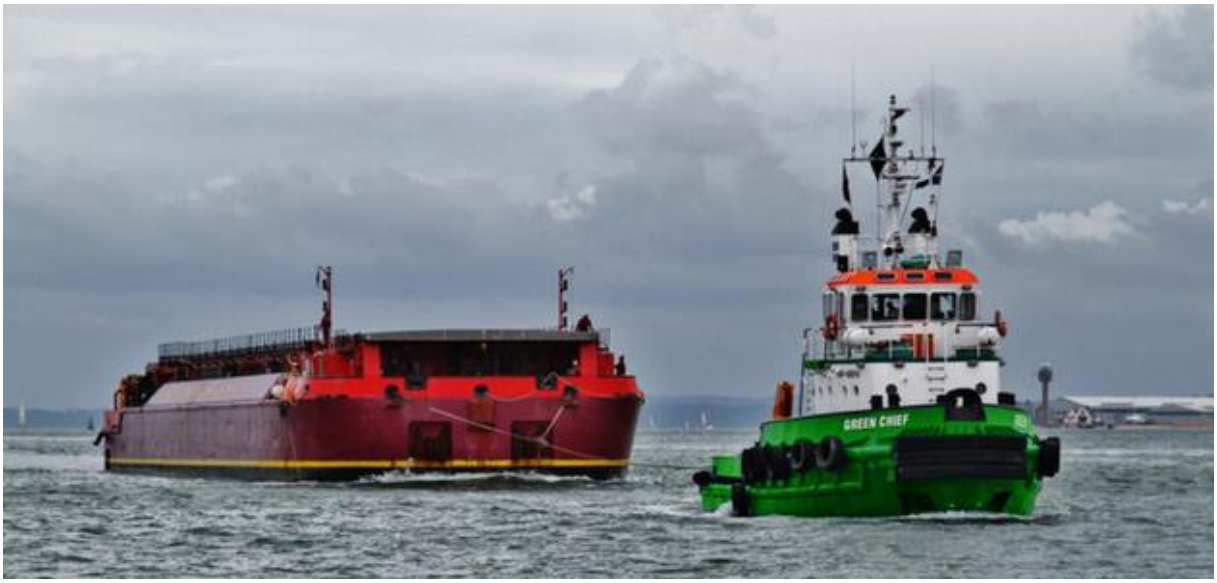
Leask Marine	
Vessel Name	MV Prosperous
Type of vessel	Work boat
Flag state	UK
Port of registration	Kirkwall
Year built	1988
Vessel International Maritime Organisation Number (IMO)	
Official number	728642
Call sign	2HHN3
Vessel Owner	Leask Marine
Operating Company	Leask Marine
Length	11.6 m
Beam	4.2 m
Draught	2.0 m



All the details above have been taken from: http://www.leaskmarine.com/index.php [19.03.2018]

Green Marine	
Vessel Name	Green Isle
Type of vessel	DAMEN Multi-Cat vessel
Flag state	UK
Yard number	571674 / A15058
Year built	
Vessel International Maritime Organisation Number (IMO)	
Official number	
Call sign	
Vessel Owner	Green Marine
Operating Company	Green Marine
Length	27.70 m
Beam	12.45 m
Draught	2.89 m

Green Marine	
Vessel Name	Green Chief
Type of vessel	DAMEN Stan Tug
Flag state	UK
Yard number	3113
Year built	1980
Vessel International Maritime Organisation Number (IMO)	
MMSI	235.075.142
Official number	
Call sign	
Vessel Owner	Green Marine
Operating Company	Green Marine
Length	26.0 m
Beam	7.80 m
Draught	3.00 m



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