

# Notice to Mariners

**Beatrice Offshore Windfarm Limited (BOWL) – Notice to Mariners March 2017.**

## Foundation Piling Operations

<b>Date of Notice</b>	<b>26<sup>th</sup> March 2017</b>
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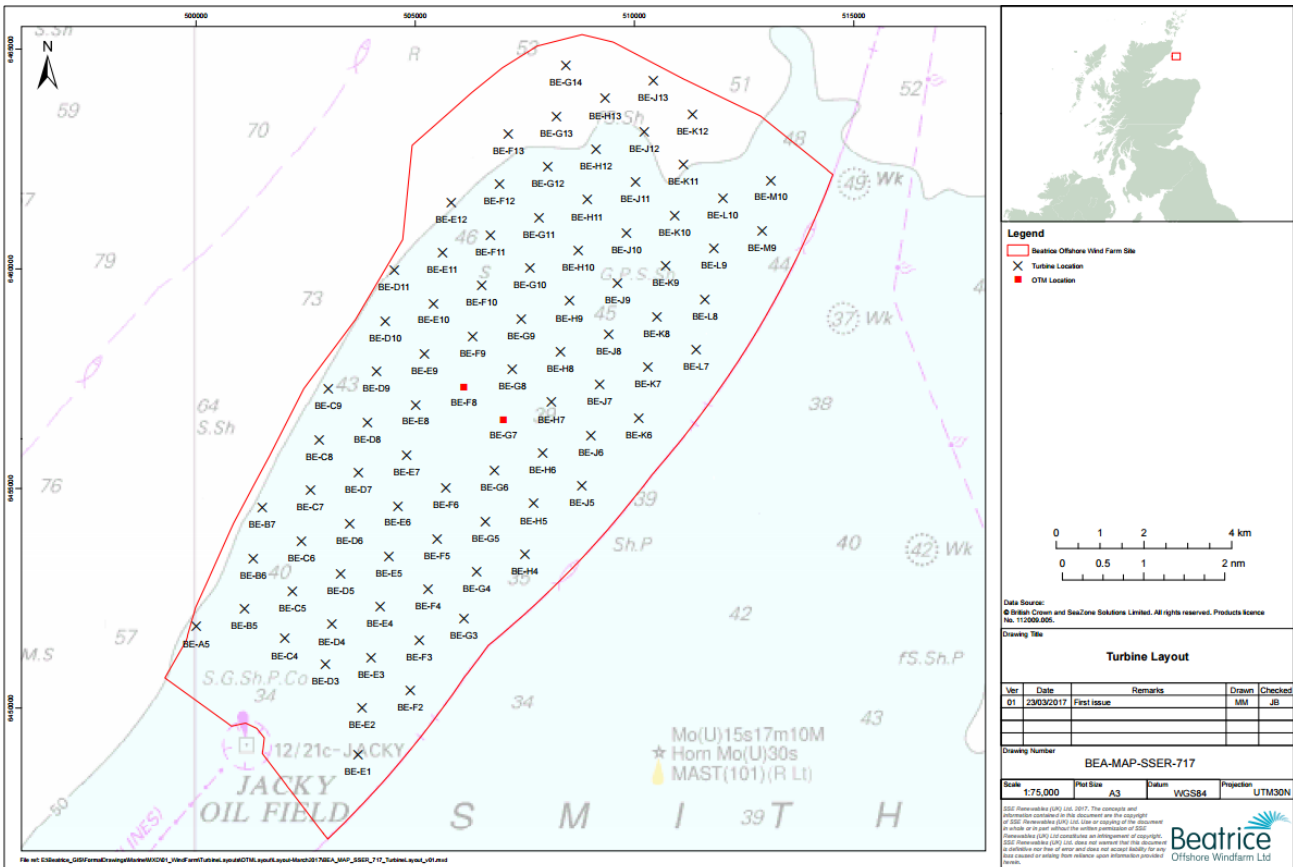
Please promulgate the following as a notice to mariners:

### Foundation Piling Operations

In preparation for the installation of wind turbine foundations in the Beatrice Offshore Windfarm construction site, piles will be installed in the seabed on each of the foundation locations outlined in Table 1 below.

The work listed is due to be carried out as described below.

On behalf of BOWL, Seaway Heavy Lifting will deploy various vessels to carry out the aforementioned work during the period 27/03/2017 – 31/10/2017 within the boundary of the BOWL construction site.



**Fig 1** BOWL construction site showing foundation locations

**Table 1 WTG and OTM Location Coordinates**

<b>Location ID</b>	<b>Latitude (ddm) WGS84</b>	<b>Longitude (ddm) WGS84</b>
BE-A5	58 12.471' N	002 59.996' W
BE-B5	58 12.687' N	002 58.873' W
BE-B6	58 13.308' N	002 58.664' W
BE-B7	58 13.929' N	002 58.456' W
BE-C4	58 12.307' N	002 57.948' W
BE-C5	58 12.902' N	002 57.749' W
BE-C6	58 13.524' N	002 57.541' W
BE-C7	58 14.144' N	002 57.332' W
BE-C8	58 14.766' N	002 57.124' W
BE-C9	58 15.386' N	002 56.915' W
BE-D3	58 11.995' N	002 57.002' W
BE-D4	58 12.497' N	002 56.834' W
BE-D5	58 13.117' N	002 56.626' W
BE-D6	58 13.739' N	002 56.417' W
BE-D7	58 14.359' N	002 56.209' W
BE-D8	58 14.981' N	002 55.999' W
BE-D9	58 15.602' N	002 55.790' W
BE-D10	58 16.223' N	002 55.582' W
BE-D11	58 16.844' N	002 55.373' W
BE-E1	58 10.900' N	002 56.256' W
BE-E2	58 11.470' N	002 56.128' W
BE-E3	58 12.090' N	002 55.920' W
BE-E4	58 12.712' N	002 55.710' W
BE-E5	58 13.333' N	002 55.502' W
BE-E6	58 13.954' N	002 55.293' W
BE-E7	58 14.575' N	002 55.084' W
BE-E8	58 15.196' N	002 54.875' W
BE-E9	58 15.817' N	002 54.665' W
BE-E10	58 16.438' N	002 54.456' W
BE-E11	58 17.059' N	002 54.247' W
BE-E12	58 17.680' N	002 54.037' W
BE-F2	58 11.685' N	002 55.005' W
BE-F3	58 12.306' N	002 54.796' W
BE-F4	58 12.927' N	002 54.588' W
BE-F5	58 13.548' N	002 54.378' W
BE-F6	58 14.168' N	002 54.169' W
BE-F8 (OTM)	58 15.411' N	002 53.750' W
BE-F9	58 16.031' N	002 53.540' W
BE-F10	58 16.653' N	002 53.330' W
BE-F11	58 17.274' N	002 53.120' W
BE-F12	58 17.894' N	002 52.911' W
BE-F13	58 18.516' N	002 52.701' W

Location ID	Latitude (ddm) WGS84	Longitude (ddm) WGS84
BE-G3	58 12.544' N	002 53.726' W
BE-G4	58 13.142' N	002 53.464' W
BE-G5	58 13.762' N	002 53.254' W
BE-G6	58 14.384' N	002 53.044' W
BE-G7 (OTM)	58 15.004' N	002 52.834' W
BE-G8	58 15.625' N	002 52.625' W
BE-G9	58 16.247' N	002 52.415' W
BE-G10	58 16.867' N	002 52.204' W
BE-G11	58 17.488' N	002 51.994' W
BE-G12	58 18.109' N	002 51.784' W
BE-G13	58 18.730' N	002 51.574' W
BE-G14	58 19.351' N	002 51.362' W
BE-H4	58 13.356' N	002 52.339' W
BE-H5	58 13.977' N	002 52.130' W
BE-H6	58 14.598' N	002 51.920' W
BE-H7	58 15.219' N	002 51.709' W
BE-H8	58 15.840' N	002 51.499' W
BE-H9	58 16.461' N	002 51.289' W
BE-H10	58 17.082' N	002 51.079' W
BE-H11	58 17.703' N	002 50.867' W
BE-H12	58 18.324' N	002 50.657' W
BE-H13	58 18.944' N	002 50.446' W
BE-J5	58 14.192' N	002 51.005' W
BE-J6	58 14.812' N	002 50.795' W
BE-J7	58 15.433' N	002 50.585' W
BE-J8	58 16.055' N	002 50.373' W
BE-J9	58 16.675' N	002 50.163' W
BE-J10	58 17.296' N	002 49.952' W
BE-J11	58 17.917' N	002 49.741' W
BE-J12	58 18.538' N	002 49.530' W
BE-J13	58 19.159' N	002 49.319' W
BE-K6	58 15.027' N	002 49.669' W
BE-K7	58 15.648' N	002 49.459' W
BE-K8	58 16.269' N	002 49.247' W
BE-K9	58 16.890' N	002 49.036' W
BE-K10	58 17.510' N	002 48.825' W
BE-K11	58 18.131' N	002 48.614' W
BE-K12	58 18.752' N	002 48.403' W
BE-L7	58 15.862' N	002 48.333' W
BE-L8	58 16.482' N	002 48.122' W
BE-L9	58 17.104' N	002 47.910' W
BE-L10	58 17.724' N	002 47.698' W
BE-M9	58 17.317' N	002 46.784' W
BE-M10	58 17.938' N	002 46.571' W

The Heavy Lift Vessel conducting the piling operations is the Stanislav Yudin shown Fig 2.

<b>STANISLAV YUDIN</b>	
<b>General Description and Dimensions:</b>	Heavy Lift Vessel LOA 183.3m Breadth 40.0m
<b>Call Sign:</b>	5BYM2
<b>MMSI:</b>	210334000
<b>Onshore Representative:</b>	Steve Bell – sbell@shl.nl

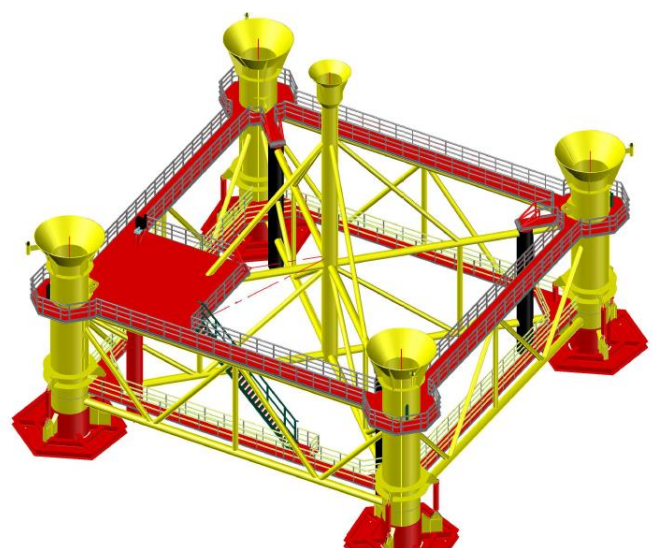


**Fig 2** Stanislav Yudin

### Piling Operations

Pile foundations will be installed by the Heavy Lift Vessel (HLV) Stanislav Yudin, which will arrive at the proposed foundation installation location and will be positioned in readiness for the foundation installation works. This will involve the placing of an eight point anchor spread using two dedicated anchor handling tugs, Bremen Fighter and Smit Sentosa.

Pile foundations will be installed by the use of a Pile Installation Frame (PIF), an example of which is shown in Figure 3. Pile installation tolerances will be achieved through the use of a hydraulically operated PIF with sufficient travel to accommodate the worst case seabed slopes to ensure the piles are installed correctly.



**Fig 3** Pile Installation Frame (PIF)



**Fig 4.** PIF lowering.

The PIF will be lifted from the HLV and lowered to the seabed in position ready for the piling operations and levelled hydraulically to take into account seabed slope. Each of the four piles is then lifted and lowered into the PIF in readiness for the piling operation. The approximate duration of pile installation frame positioning will be up to 4 hours.

The pile foundations will be delivered to the HLV by cargo barge directly from the manufacturing site. The cargo barge will be moored alongside the HLV and the four piles will each be lifted and transferred to the deck of the HLV. The cargo barge will then be unmoored and will depart. Each of the four piles will then be lifted, upended, lowered into the PIF and vibrated (vibro-piled) in readiness for the piling operation.

Vibro-piling is a technique used to make the pile oscillate at a low frequency of about 20Hz. Having been lifted into the PIF, each pile will be vibro-piled to a nominal penetration or until refusal, whichever occurs first. This process continues until all four piles are settled in the PIF. The purpose of the vibropiling will be to settle the piles into the PIF in advance of percussive piling. The approximate duration of pile installation at each location is 7 hours. The approximate duration of vibropiling will be up to 2 hours at each location.

### **Piling Mitigation protocol**

The piling hammer will be lifted on to the top of the first pile in the PIF. The approximate duration of setting up the piling hammer on the first pile will be 2 hours. Prior to commencing piling the Piling Mitigation Protocol will be implemented. This will include the deployment of the Acoustic Deterrence Device (ADD) and a soft start piling procedure.

The approximate duration of mitigation depends on the duration of any breaks, the ADDs may also be deployed concurrently with setting up the piling hammer.

### **Piling to Full Penetration**

Following completion of the mitigation described above, the piling operators will gradually increase the hammer energy applied until the pile is penetrating the seabed at the target rate of approximately 1 cm to 2.5 cm per hammer strike (see Figure 6.7 for pile hammer installing a pile). If this target rate is reached with a lower than anticipated hammer energy, the hammer energy is unlikely to be increased further. Final penetration depth is reached when the pile foundations stick up between 2m and 6m above the seabed. Once the first pile in the PIF has been fully installed, the hammer will be repositioned to commence piling at the next pile in the PIF. The mitigation implemented prior to commencing this second piling event will depend on the duration of the break between piling each pile in the PIF as set out in the Piling Mitigation Protocol. The anticipated duration for re-positioning the hammer to commence piling at the next pile in the PIF will be 10 minutes to 1 hour. For the four piles hammer re-positioning may therefore take up to 3 hours in total.

The anticipated duration of piling to full penetration depth (including the mitigation period) at each wind turbine or OTM location ranges between 5.4 to 12.7 hours. Once all four of the piles in the PIF have been pile-driven to the required depth pile

metrology is performed (measurements to determine pile position and depth is satisfactory). The duration for performing



**Figure 5** Hammer positioned on pile

pile metrology is 1 hour. The PIF will then be recovered back to the deck of the HLV and the HLV will be readied for transit to the next foundation location. Recovery of the PIF will take approximately 2.5 hours.

### Supporting Vessels for the Stanislav Yudin

The anchor handling vessels working with the Stanislav Yudin are Bremen Fighter (Fig 6) and Smit Sentosa (Fig 7).

The operation will involve placing an anchor spread using a dedicated AHT, using up to eight anchors, with each anchor up to 850 metres from the Stanislav Yudin. An anchor buoy will mark the anchor position.

BREMEN FIGHTER	
<b>General Description and Dimensions:</b>	Anchor Handling Tug LOA 48,81m Breadth 14.06m
<b>Call Sign:</b>	V2OY1
<b>MMSI:</b>	404742000
<b>Onshore Representative:</b>	Steve Bell – sbell@shl.nl



**Fig 6.** AHT Bremen Fighter

<b>SMIT SENTOSA</b>	
<b>General Description and Dimensions:</b>	Anchor Handling Tug LOA 51.8M Breadth 15.0m
<b>Call Sign:</b>	ORRX
<b>MMSI:</b>	205696000
<b>Onshore Representative:</b>	Steve Bell – sbell@shl.nl



**Fig 7. AHT Smit Sentosa**

The Bremen Fighter and Smit Sentosa will exhibit appropriate lights and shapes prescribed by the International Regulations for Preventing Collisions at Sea; relative to the operation. They will also transmit an AIS message.

#### **General Safety Advice**

All vessels engaged in the activity will exhibit appropriate lights and shapes prescribed by the International Regulations for Preventing Collisions at Sea; relative to their operations. All vessels engaged in the activity will also transmit an Automatic Identification System (AIS) message.

The Secretary of State has authorised the use of the following safety zones as per Notice to Mariners LF000005-NTM-005 Notification of Safety Zones.

- 500 metres radius around each wind turbine, offshore transformer module and/or their substructures and foundations comprising the Beatrice Offshore Wind Farm whilst work is being performed as indicated by the presence of construction vessels.
- 50 metres radius around each wind turbine, offshore transformer module and/or their substructure and foundations installed but waiting to be commissioned as part of the Beatrice Offshore Wind Farm.

ALL VESSELS ARE REQUESTED to give all construction and support vessels a wide berth.

MARINERS ARE REMINDED to navigate with caution and keep continued watch on VHF Ch. 70 / 16 when navigating the area.

LF000005-NTM-006 Notice to Mariners Foundation piling operations

Fisheries liaison associated with the activity will be co-ordinated by Brown and May Marine. For any commercial fishery queries please contact: Alex Winrow-Giffin, telephone: +44 (0)1379 872145 and mobile: +44 (0)7702 710178

Any questions regarding this Notice to Mariners should be directed to Beatrice Offshore Wind Farm Marine Coordination office.

Notice issued by:

BOWL Marine Coordinator  
Beatrice Offshore Windfarm Limited  
Unit 1  
Harbour Office  
Wick  
Caithness  
KW1 5HA  
email: [mc.bowl@sse.com](mailto:mc.bowl@sse.com)  
phone: +44 (0) 3302020329  
web site: [www.sse.com/beatrice](http://www.sse.com/beatrice)