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December 8, 2020

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RE: Dominion Energy CVOW Pilot Project – Revised Protected Species Observer (PSO) Monitoring Report and Pile Driving Noise Monitoring Report for WTG Construction and Observations

Mr. Bennett and Ms. Harrison:

Virginia Electric and Power Company, d/b/a Dominion Energy Virginia (Dominion Energy) on behalf of the Virginia Department of Mines, Minerals, and Energy (DMME), is pleased to submit this revised Protected Species Observer (PSO) Final Monitoring Report and Pile Driving Noise Monitoring Report for WTG Construction and Observations in accordance with the Coastal Virginia Offshore Wind Pilot (CVOW Pilot) Project Research Activities Plan Revision (RAPR) Condition 9.6.

Please contact Scott Lawton at scott.lawton@dominionenergy.com or (804) 273-2600 if you have any questions or require additional information.

Sincerely,

A handwritten signature in black ink that reads "Joshua J. Bennett".

Joshua J. Bennett
Vice President, Offshore Wind

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Document title:

FINAL NOISE AND PSO MONITORING REPORT

Project:

CVOW - COASTAL VIRGINIA OFFSHORE WIND

Subproject:



COMBINED TRANSPORT AND INSTALLATION OF FOUNDATIONS AND WTG

EMPLOYER:



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CVOW - Coastal Virginia Offshore Wind Combined Foundation and Turbine T&I	Reference	JDN1823.REP.62.32.E
Final Noise and PSO Monitoring Report	Revision	0.9



Document distribution and access

The latest approved revision of this document is accessible to all members of the Project Management Team on the network server.

Revision change details

Revision	Location	Brief description of change
0.0	n/a	First issue
0.1	Annex B	Added PSO Monitoring Final Report
0.2	Annex A & Annex B	Changes made as per the Employer's comments.
0.3	Annex A	Changes made as per the Employer's comments.
0.4	Annex B	Changes made as per the Employer's comments.
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Table 0-1 - Revision change details

		
CVOW - Coastal Virginia Offshore Wind Combined Foundation and Turbine T&I	Reference	JDN1823.REP.62.32.E
Final Noise and PSO Monitoring Report	Revision	0.9

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Final Noise and PSO Monitoring Report	Revision	0.9

1 SCOPE

Annex A and Annex B of this document contain the reports presenting the results of:



- underwater noise monitoring (Annex A)
- protection species observation activities (Annex B)

during pile driving operations on A01 and A02 Project sites.

2 ANNEXES

Annex A: Final Noise Monitoring Report (34 pages)

Annex B: PSO Monitoring Final Report (98 pages)

 Jan De Nul n.v.		
CVOW - Coastal Virginia Offshore Wind Combined Foundation and Turbine T&I	Reference	JDN1823.REP.62.32.E
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ANNEX A: FINAL NOISE MONITORING REPORT

Coastal Virginia Offshore Wind

Noise monitoring during monopile installation A01 and A02

Client:

Jan De Nul NV

Date:

28 November 2020

Clients Reference:

USA-1823-VCW01

Our Reference:

WP2019_1197_R4r8

Version:

Final

Title

Coastal Virginia Offshore Wind Pilot. Noise monitoring during monopile installation A01 and A02.

Client

Jan De Nul NV

Reference

WP2019_1197_R4r8

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Noise monitoring, underwater acoustics, monopile, pile-driving, bubble curtain, noise mitigation, marine mammals, CVOW, Virginia, windfarm

Summary

Monopile foundations A02 and A01 were installed as part of the CVOW pilot project. Underwater sound levels were measured during impulsive pile driving and are presented for both monopile foundations. Based on the measured sound levels, distances to disturbance and injury thresholds are calculated for fish, turtles and marine mammals, and the effectiveness of the applied noise mitigation measures is determined.

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R4r8	28 November 2020	J. A. Brinkkemper	R. C. Snoek



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1 INTRODUCTION

This report presents the results of the underwater noise measurements during the installation of the wind turbine foundations A02 and A01 as part of the Coastal Virginia Offshore Wind (CVOW) pilot project. These foundations were installed by means of pile driving on the 25th and 30th of May 2020, respectively.

The Coastal Virginia Offshore Wind (CVOW) pilot project consists of two 6 MW wind turbine generators, located 43 km east of the city of Virginia Beach, Virginia. The turbine foundations are monopiles with a diameter of 7.8 meters and a length of approximately 67 m. The installation of monopile foundations in the seabed includes pile driving, an activity that results in high underwater noise levels. These noise levels can potentially cause injury or disturb underwater life, such as marine mammals, sea turtles and fish.

Here, measured sound levels are presented for the piling procedure of both monopile foundations, distances to disturbance and injury thresholds are calculated for fish, turtles and marine mammals, and the effectiveness of the applied noise mitigation measures is determined. Jan De Nul (JDN) was responsible for the acoustic measurements, including the deployment and retrieval of the recorders with attached hydrophones. WaterProof Marine Consultancy & Services BV. (WaterProof) conducted the data processing, analysis and reporting of these acoustic measurements.



2 PILING PROCEDURE AND ENVIRONMENTAL CONDITIONS

The two monopile foundations (A02 and A01) for the wind turbines were installed by means of impulse pile driving, on (A02) 25 May 2020 from 15:33 to 17:14 and on (A01) 30 May 2020 from 11:23 to 12:38 (UTC-4). The IHC S-3000 hydrohammer was used to drive the monopile foundations, with a bottom diameter of 7.8 m and wall thickness of 86 mm, to a penetration depth of 37.51 m and 37.01 m for A02 and A01, respectively. The used piling energy was between 320 and 552 kJ for A02 and between 320 and 687 kJ for A01 (Figure 2.1), the total amount of blows was 1373 and 1558, respectively. Both a soft (low piling energy) start and a slow (large time period between strikes) start were used to reduce the noise impact by giving time to marine life to increase their distance to the piling location. Pile driving of foundation A01 was paused from 12:05 to 12:31 (Figure 2.1) for a survey check calibration to verify the pile height, the duration of this pause (26 min.) was shorter than 30 minutes and a soft start after the pause was thus not necessary.

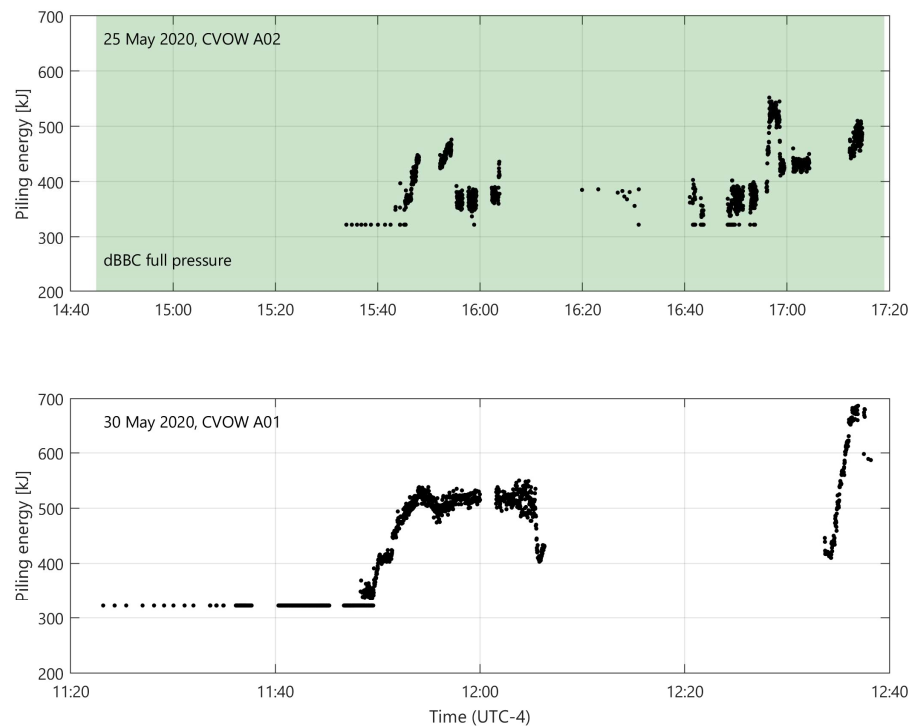


Figure 2.1 Piling energy per blow during installation of A02 and A01. The time period for which the double Big Bubble Curtain (dBBC) was on full pressure during installation of A02 is indicated in green.

During the installation of A02, a double Big Bubble Curtain (dBBC) was deployed to reduce underwater noise levels during the piling procedure. The dBBC consists of two hoses (an inner and an outer hose) with nozzles (diameter of 1.5 mm and distance of 250 mm) that are laid on the seabed and both fully encompass the monopile foundation (Figure 2.2). During the piling procedure, these hoses are connected to air compressors that are located on the Noise Mitigation Vessel (NMV). Air bubbles leave

the hose nozzles and rises as air bubbles to the water surface, thus forming a bubble curtain. The minimum distance between the monopile foundation A02 and the location of the hoses was 84 and 124 m for the inner and outer hose. The 16 compressors that fed both the inner and outer hose were on full pressure between 14:45 and 17:19 (UTC-4), see Figure 2.1, and inserted $0.35 (\pm 0.03) \text{ m}^3/(\text{min}\cdot\text{m})$ into the hoses. Monopile foundation A01 was installed without a bubble curtain.



Figure 2.2 The double Big Bubble Curtain (dBBC), deployed and operated from the M/V Commander, during the installation of monopile A02.

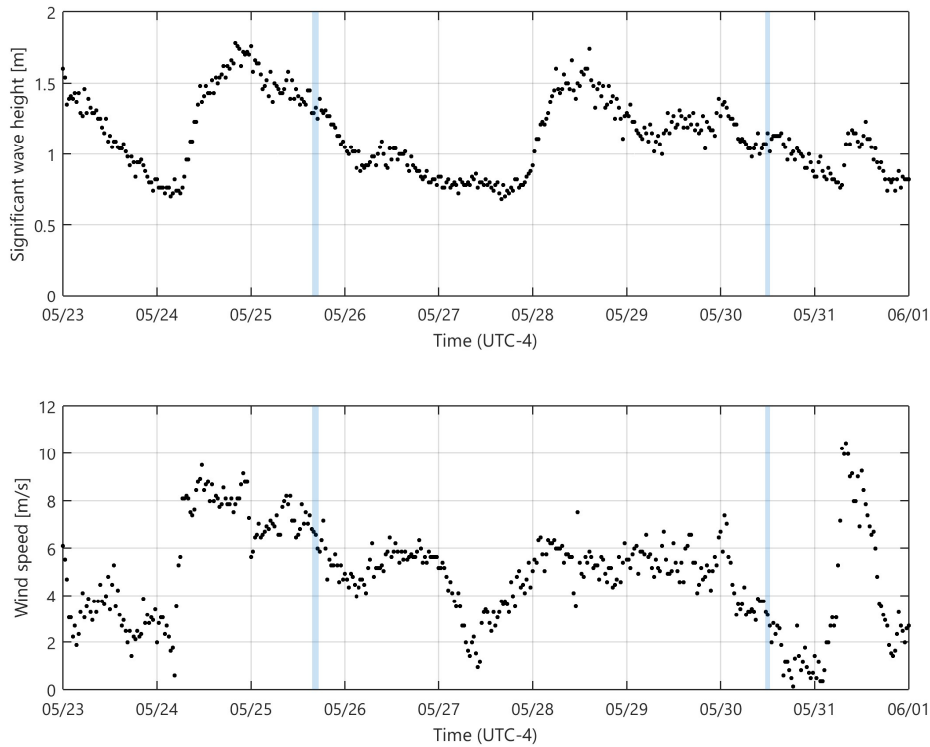


Figure 2.3 The (top) significant wave height and (bottom) wind speed during the week in which the monopiles were installed. The shaded intervals in blue indicate the time periods in which pile driving took place.

The weather and hydrodynamic conditions during the installation period were measured using a directional waverider buoy. The average wind speed was between 6 and 8 m/s during the installation of A02, and between 2 and 4 m/s during the installation of A01 (Figure 2.3). Corresponding significant wave heights were around 1.3 and 1.2 m, respectively. Tidal flow velocities in the area are relatively low, up to 0.10 to 0.25 m/s, but wind-induced flow velocities exceeded 0.5 m/s during the week in which installation took place (25 May – 01 June, Figure 2.4). Flow velocities during pile driving were between 0.15 near the bed and 0.32 m/s near the water surface during the installation of A02, and below 0.1 m/s throughout the water column during the installation of A01.

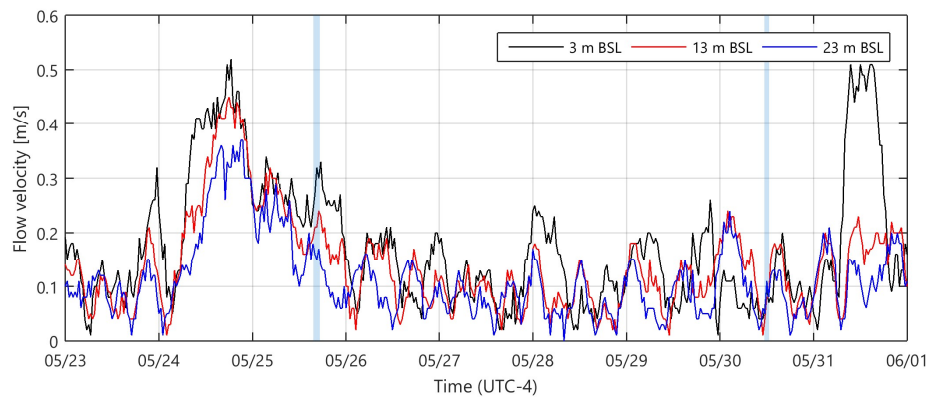


Figure 2.4 The flow velocity at (black) 3 m, (red) 13 m and (blue) 23 m below the instantaneous sea level (BSL). The lowest heights correspond roughly with the elevation of the two hydrophones. The shaded intervals indicate the time periods in which pile driving took place.

3 METHODS

3.1 MEASUREMENTS

3.1.1 Equipment

The acoustic recorders used are manufactured by RTsys and were equipped with two HTI (High Tech Inc.) hydrophone, HTI-96_min type, (Table 3.1). These hydrophones are sensitive to sound pressure levels in the frequency range between 2 Hz and 30 kHz. Recording was set at a sampling frequency of 78.125 kHz with 24-bits digitization. All instruments were checked prior to and after a deployment with a basic functionality test using a G.R.A.S. pistonphone (s.n. number 227957) at 250 Hz.

Table 3.1: Overview of the equipment used for this report. Additional equipment (in grey) at 4900 m and the second station at 750 m were only deployed during the installation of A01.

Distance [m]	Recorder serial nr.	Height [m]	Chan.	Hydrophone serial nr.	Hydrophone sensitivity [dB re 1V/ μ Pa]	Factory calibration
750	EA_SDA14_2001006	1	A	785226	-209.7	HTI, 18 Jul. 2018
		12	B	785231	-209.2	HTI, 18 Jul. 2018
1500	EA_SDA14_2001005	1	A	785234	-209.5	HTI, 18 Jul. 2018
		12	B	785229	-209.3	HTI, 18 Jul. 2018
3000	EA_SDA14_2001004	1	B	785314	-210.1	HTI, 20 Mar. 2020
		12	A	785225	-209.6	HTI, 18 Jul. 2018
4900	EA_SDA14_2002001	1	B	785096	-209.9	HTI, 13 Mar. 2015
		12	A	785233	-209.7	HTI, 18 Jul. 2018
750 (2)	EA_SDA14_2001003	1	B	785232	-209.5	HTI, 18 Jul. 2018
		12	A	785230	-209.7	HTI, 18 Jul. 2018

The set-ups of the different stations were identical and consisted each of one recorder with two hydrophones, at 1 m and 12 m above the bed (Figure 3.1). The instruments were attached to a nylon line in between an anchor weight and a subsurface float. The subsurface float was subsequently attached to a surface buoy and pickup buoy for deployment and retrieval of the stations. The use of shackles or other metal items was minimized to avoid disturbance in the measurements. Shackles, coated with tape, were used in case necessary.



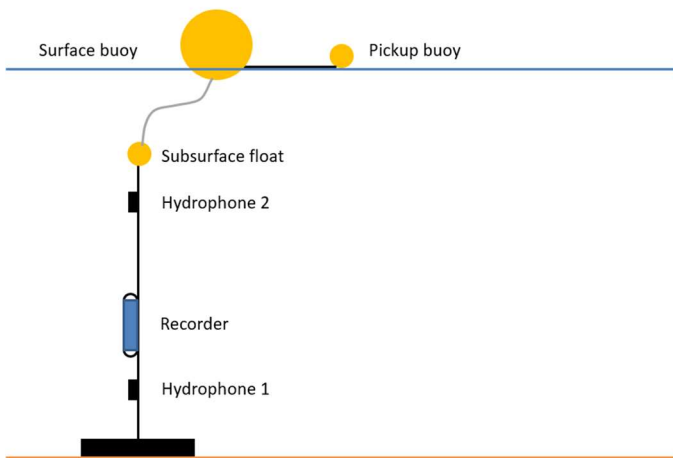


Figure 3.1 Setup of the measurement stations with a hydrophone at 12 and 1 m above the bed (not to scale).

3.1.2 Measurement locations

The distances of the noise monitoring locations to the monopile foundations were chosen to cover the expected range in distances to the sound levels that can cause disturbance or injury for fish, sea turtles and marine mammals. Instruments were deployed at distances 750, 1500 and 3000 m for both monopiles (Figure 3.2 and Table 3.2) in Northern direction. An additional sound recorder was deployed at 4900 m distance for A01, as this foundation was installed without the use of bubble curtains as noise mitigation measure, and distances to the noise thresholds were thus expected to become larger.

While instruments were deployed at three distances (750, 1500 and 3000 m) during the installation of monopile foundation A02, measurements were not collected at 1500 m due to a technical malfunction of the underwater sound recorder. Due to this malfunction, only measurements at two locations are available for A02, limiting the calibration of the transmission loss model. To attain more input for the calibration of this model, it was decided to deploy the instrument at 4900 m for A01 as an extra location, instead of enlarging the distance of the 3000 m location. Moreover, it was decided to deploy an extra recorder at 750 m distance for redundancy. The deployment of recorders at these two additional measurement locations was only feasible as the noise mitigation vessel had ample time for the preparation and deployment of the systems prior to the piling activities, due to a weather delay and the decision to install the second pile without a bubble curtain.

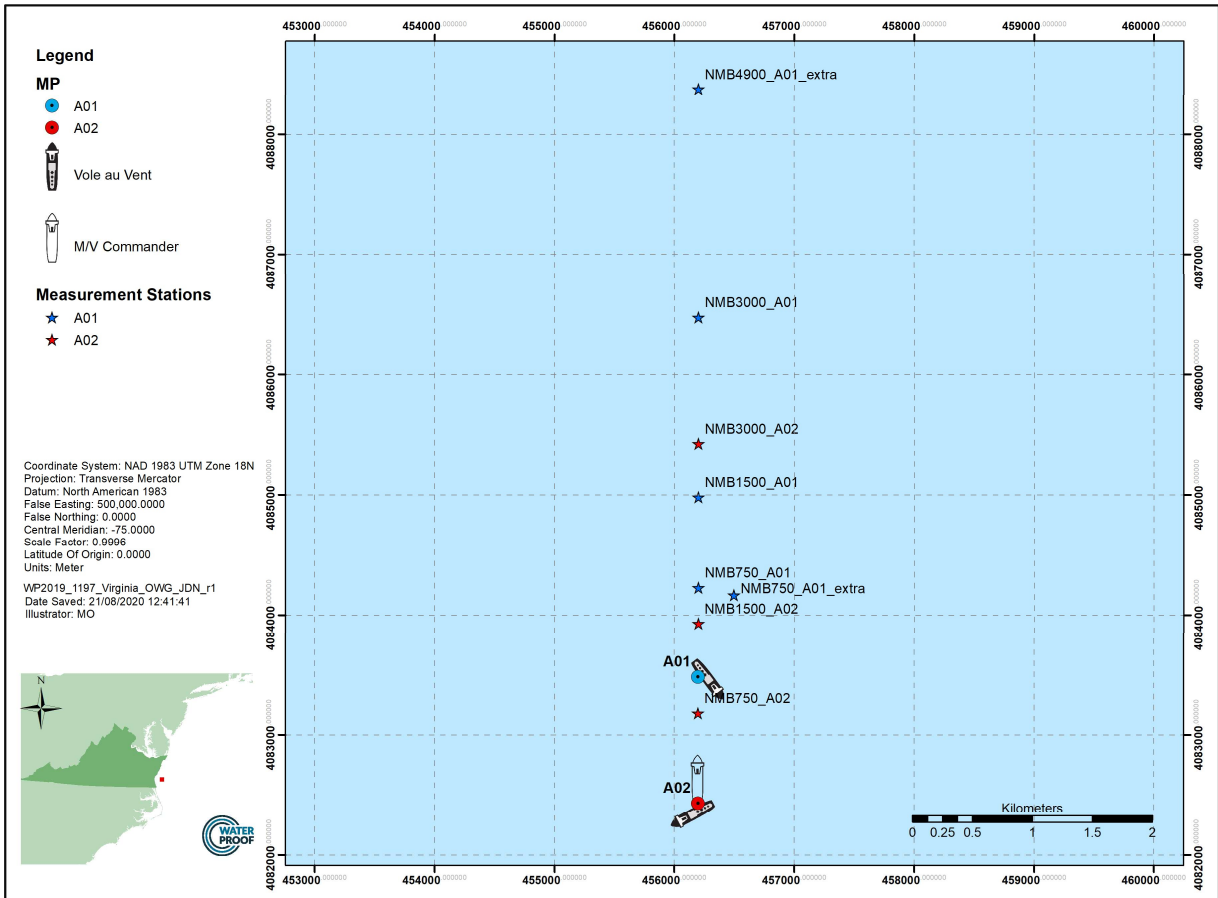


Figure 3.2 Location of the noise monitoring buoys during the installation of monopiles (red) A02 and (blue) A01. The location and heading of the installation vessel Vole au Vent (A02 and A01) and noise mitigation vessel M/V Commander (A02) during pile driving are also indicated.

Table 3.2 Coordinates (NAD 83 UTM Zone 18N) of the measurement locations, and the bearing and actual distance to the monopile (MP) foundations.

	Easting (m)	Northing (m)	Bearing to MP	Distance to MP
A02 MP foundation	456196.93	4082429.99	-	-
NMB750 A02	456197.00	4083181.48	0°	751.5 m
NMB1500 A02	456199.52	4083928.58	0°	1498.6 m
NMB 3000 A02	456200.87	4085429.72	0°	2999.7 m
A01 MP foundation	456196.93	4083479.99	-	-
NMB750 A01	456199.42	4084226.62	0°	746.6
NMB1500 A01	456200.78	4084980.79	0°	1500.8
NMB300 A01	456200.77	4086476.02	0°	2996.0
NMB4900 A01	456202.24	4088381.00	0°	4900.1
NMB750 A01 extra	456495.40	4084164.06	23°	747.3



3.2 DATA PROCESSING AND ANALYSES

3.2.1 Processing raw data

Raw voltages were converted to a sound pressure waveform using the specific gain parameters and sensitivity of the individual measurement devices. Data was subsequently filtered with a high-pass filter of 5Hz, to filter out low-frequency sound or disturbances by tidal flow and waves. Peaks in the sound pressure timeseries that represent the piling blows were identified using a peak detection algorithm. The start and end of these peaks were identified in one-second windows where the cumulative energy was between 5 and 95% respectively. This is a robust method to define the start and end of a peak and separate peaks in the sound pressure timeseries that are related to piling blows.

Several metrics were calculated for the identified peaks in the timeseries. The single-strike Sound Exposure Level (SEL_{ss}) in dB re 1 $\mu\text{Pa}^2\text{s}$ was calculated for each peak individually as:

$$SEL_{ss} = 10 \log_{10} \left(\frac{E}{E_{ref}} \right),$$

in which E is the sound exposure in $\mu\text{Pa}^2\text{s}$ calculated over the 90% window between 5% and 95% of the total energy in the peak and E_{ref} is the reference intensity for underwater sound (1 $\mu\text{Pa}^2\text{s}$). The root-mean-square sound pressure level (SPL_{rms}) is evaluated over the same 90% window. The cumulative sound exposure level ($cSEL$) was calculated as the running cumulative over the individual SEL_{ss} values in 24 hours (in practice one foundation). The zero-to-peak sound pressure level (L_{peak}) is also calculated for each piling blow and is the maximum magnitude in sound pressure in the peak window.

Besides these properties of the individual peaks in the time series, the equivalent sound energy (L_{eq}) in dB re 1 $\mu\text{Pa s}$ was calculated over the decade bands between 20 Hz and 20 kHz in blocks of 30 seconds. This property gives more insight in the frequency content of the noise levels and indicates whether the sound exposure levels of the piling blows are sufficiently elevated (at least 10 dB; ISO18406, 2017) above the background or equipment noise-floor level (further referred to as the background noise level). The background noise level for pile driving measurements is typically defined as the L_{eq} level that is exceeded for 90% of the time.

The noise levels presented in the reports delivered within 24h after pile driving (WaterProof, 2020a, 2020b) were analysed with processing and analyses routines developed for quick reporting and an efficient data transfer from the offshore site. The analyses routines applied here contain more in-depth filtering and processing of the raw data to enhance the accuracy of the results. The sound metrics of the individual peaks in the recorded data that are presented here are within 1 dB difference in comparison with the results presented within 24 hours.

3.2.2 Frequency weighting

NOAA Fisheries (NOAA, 2018) defined auditory weighting functions for different marine mammal hearing groups, i.e. low-frequency, mid-frequency and high-frequency cetaceans, and phocid and otariid pinnipeds (Figure 3.3). The division of marine mammals in the different hearing groups reflects the differences between these animals in how they hear sounds at different frequencies and are based on an extensive review of the most recent scientific literature. To calculate potential Level A thresholds auditory weighting functions were combined with the cumulative sound exposure level metric, to determine suitable values for PTS for the different marine mammal hearing groups (NOAA, 2018).

Currently, the regulatory framework uses interim guidance to define Level B thresholds (NMFS, 2012) provided as unweighted root-mean square sound pressure level (SPL_{rms}) to assess Level B behavioral impacts (NMFS, 2012, 2018a).



Here, the distance from the monopile foundation to the location where the frequency weighted cumulative sound exposure level ($cSEL_{fw}$) exceed the threshold for the onset of PTS were determined for the different marine mammal hearing groups.

The frequency weighted cumulative sound exposure levels were estimated by first calculating the unweighted sound exposure levels over the decidecade bands between 20 Hz and 20 kHz for each piling blow. Background noise levels were calculated for the 5-minute period before the first piling blow, with an integration time equal to the average duration of a piling peak for that location. To avoid the inclusion of background noise in the frequency weighted cSEL values, individual SEL values that did not exceed the background levels in the same decidecade frequency band were not included (following Tougaard and Dähne, 2017). The values that did exceed the background level were weighted using the different auditory weighting functions in Figure 3.3 and summed over the duration of the installation of one foundation to attain the $cSEL_{fw}$ for each measurement location.

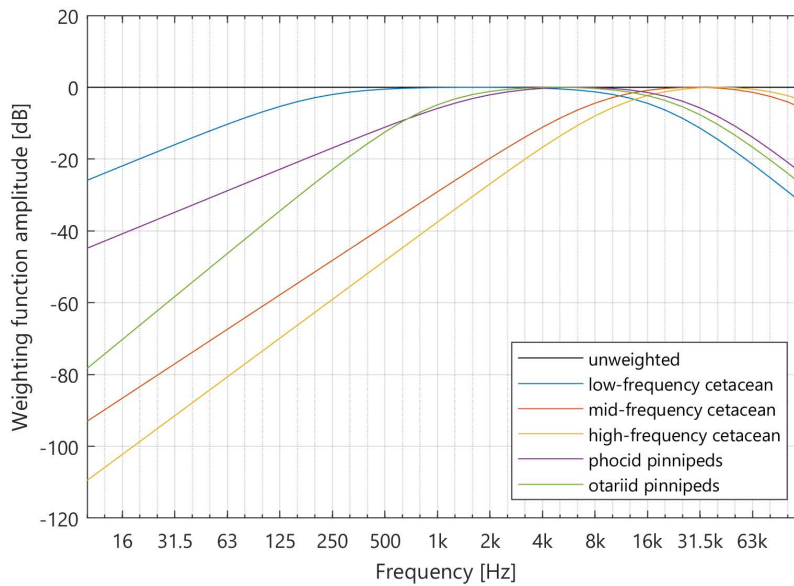


Figure 3.3 The NOAA (NOAA, 2018) frequency weighting functions for low-frequency, mid-frequency and high-frequency cetaceans, and phocid and otariid pinnipeds.

3.3 TRANSMISSION LOSS MODEL

To estimate distances to predefined thresholds for the disturbance and injury of fish, turtles and marine mammals, a damped cylindrical spreading model was used to calculate transmission losses from the sound source. The model is based on the damped cylindrical spreading (DCS) formula that was proposed by Zampolli et al. (2013) to calculate the decay of sound exposure levels from marine pile driving:

$$L_E(r) = L_E(r_1) - 10 \cdot \log_{10} \left(\frac{r}{r_1} \right) \text{ dB} - \alpha(r - r_1),$$

in which r_1 is the reference range, L_E is the depth-averaged sound exposure level and α is the decay factor in dB/m. Here, the reference range is defined at 750 m, and $L_E(r_1)$ is calculated as the average SELs measured with the two hydrophones at 1 m and 12 m above the bed. The decay factor was determined following Lippert et al. (2018), and includes the angle (θ) under which Mach cones are emitted from the monopile, a frequency dependent beam-shift (Δl), the water depth (H) and a bottom reflection coefficient (R), as:



$$\alpha = \frac{-10 \log_{10}(|R|^2)}{2H \cotan(\theta) + \Delta l} \text{ dB}$$

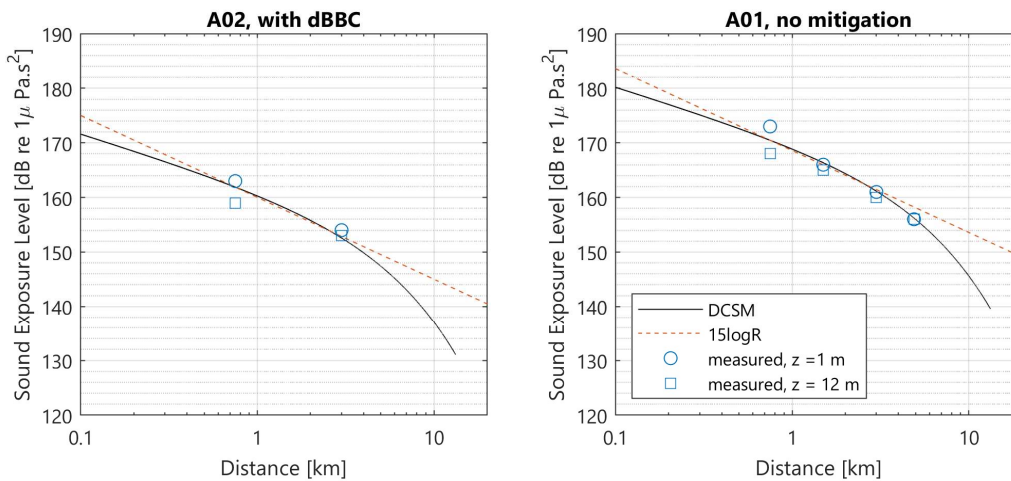


Figure 3.4 Modeled versus measured unweighted 5% exceedance single-strike sound exposure levels (SELs) for the installation of foundations (left) A02 and (right) A01.

The bottom reflection coefficient is related to seabed sediment characteristics as the bulk density, the sound speed and damping coefficient. The DCS model is valid for a range up to $\alpha r < 20$ dB (Haeney et al., 2020), as near-horizontal propagating sound is more important than the Mach cone at larger distances. The decay factor here is $\alpha = 1.47$ dB/km and the DCS model can thus be applied up to 13.6 km distance from the sound source (Figure 3.4).

The properties of the seabed sediments were attained from borehole surveys that were conducted during the preparation phase of the project. Spatial variability of the properties of the seabed sediments are not included, but are expected to be limited in the near vicinity of the monopile foundations. The seabed sediments can be described as medium sand, the used values were based on Ainslie (2010) and varied in a realistic range to calibrate the model with the collected measurements; $c_p = 1825$ m/s, $\rho = 2120$ kg/m³ and $\beta = 0.48$ db/λ. The average sound speed profile in water for the month May for the area was retrieved from the NOAA sound speed profile library, with a depth-averaged value of $c_w = 1525$ m/s.

The estimated transmission losses are not directly applicable to SPL_{rms} and L_{peak} values, as the model only determines the transmission loss for L_E . There is, however, a site-specific linear relation between L_E and these parameters (Martin and Barclay, 2019; Ainslie et al. 2020). Linear regression was carried out for both monopiles using the measured SEL_{ss} , SPL_{rms} and L_{peak} for all individual blows. Correlation coefficients were $> r^2 > 0.96$ for all regression analyses (Figure 3.5). Similar linear regression analyses was conducted to determine the decay of the frequency weighted SEL values, following Martin and Barclay (2019). Source levels for all acoustic metrics that are calculated with the DCS model are given in Table 3.3.

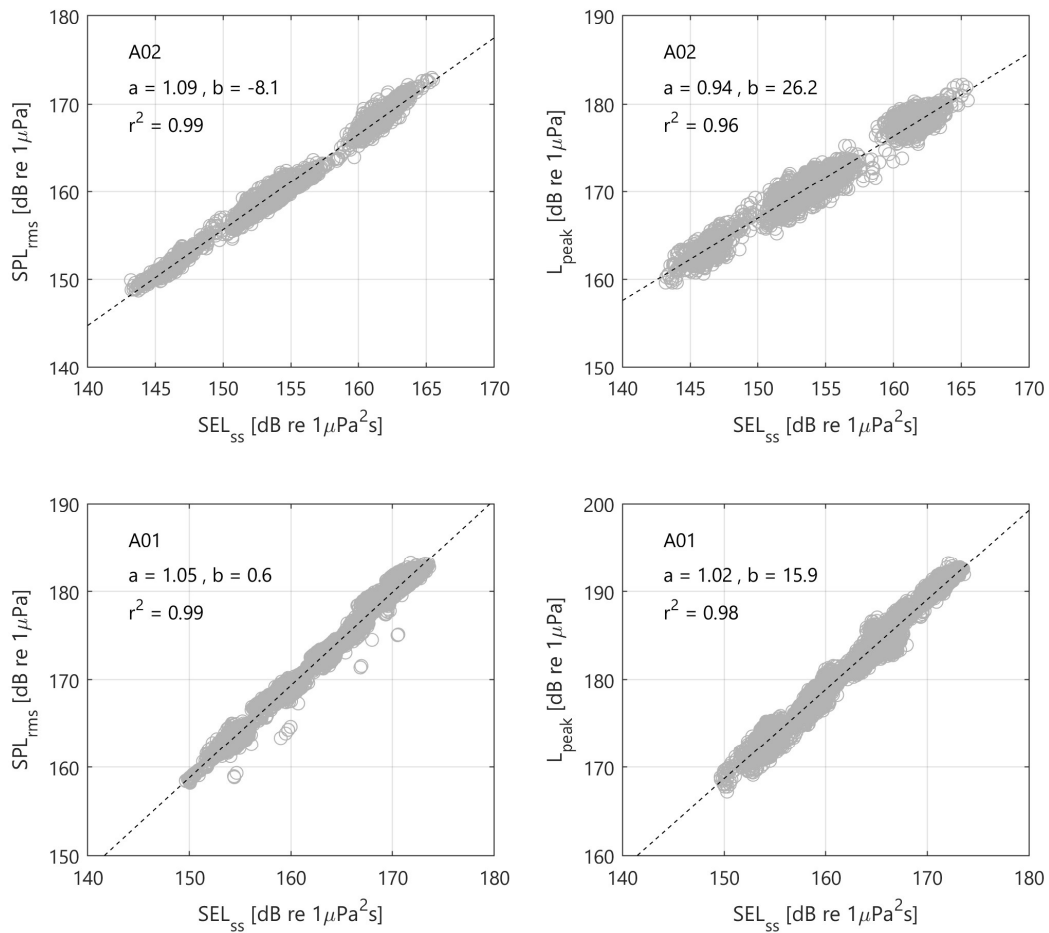


Figure 3.5 Regression analyses for the (left) SPL_{rms} and (right) L_{peak} versus SEL_{ss} for (top) A02 and (bottom) A01.

The DCS model does not include effects of variable bathymetry over range, but the seabed around the monopiles is relatively flat. From the location of the monopiles to a distance of 10 km, the water depth increases/decreases with maximum 5 m. This gives minimal differences in modelled sound exposure levels (Figure 3.6). Earlier studies for this area showed that due to this minimal variation in water depth surrounding the monopiles, main uncertainties in the spatial spreading of sound at larger distances are related to unknown heterogeneity in the seabed sediments (e.g., Haeney, 2020). Uncertainty in the directional variability in SEL levels is further increased with the application of a dBBC, which typically introduces up to 2-3 dB directional variability in the SEL levels.

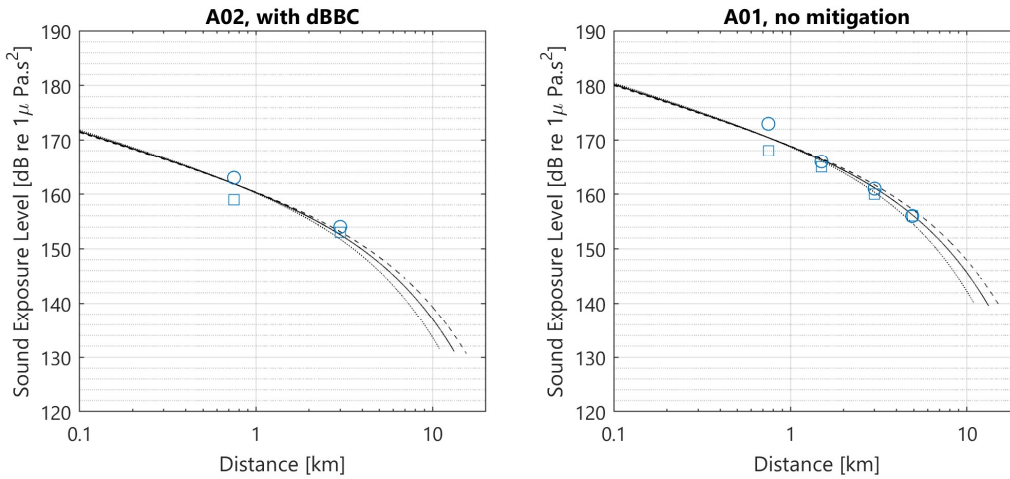


Figure 3.6 Sound exposure levels (SELs) modeled for the water depth of (dotted line) 20, (solid line) 25 and (dashed line) 30 m versus measurements.

Table 3.3 Source levels @1m calculated using the DCS model.

Noise metric	Source level @ 1m A02	Source level @ 1m A01
SPL _{rms}	204 dB re 1 μPa	213 dB re 1 μPa
L _{peak}	212 dB re 1 μPa	221 dB re 1 μPa
cSEL _{uw}	221 dB re 1 μPa ² s	229 dB re 1 μPa ² s
cSEL _{lf}	215 dB re 1 μPa ² s	224 dB re 1 μPa ² s
cSEL _{mf}	189 dB re 1 μPa ² s	197 dB re 1 μPa ² s
cSEL _{hf}	186 dB re 1 μPa ² s	194 dB re 1 μPa ² s
cSEL _{ow}	204 dB re 1 μPa ² s	214 dB re 1 μPa ² s
cSEL _{pw}	202 dB re 1 μPa ² s	211 dB re 1 μPa ² s

4 RESULTS

4.1 MEASUREMENTS

4.1.1 Monopile A02 with dBBC

During the piling procedure to install monopile foundation A02, measurements at two distances, i.e. 750 and 3000 m, were collected (equipment was also installed at 1500 m distance, but no measurements were collected due to a malfunction, see Section 3.1.2.). At both locations, two hydrophones were spaced vertically, with one hydrophone at 1 m above the bed and one hydrophone in mid water depth, i.e. 12 m above the bed. During the installation of this foundation, noise levels were reduced using a dBBC.

Broadband and unweighted sound exposure levels (SEL_{ss}) were between 149 and 166 dB re $1 \mu Pa^2 s$ at 750 m and between 143 and 157 dB re $1 \mu Pa^2 s$ at 3000 m (Table 4.1). Maximum sound levels were recorded around 16:55 (Figure 4.1), corresponding with the highest piling energy (Figure 2.1). The unweighted cumulative level ($cSEL_{LW}$) for the 1373 blows decreased from 188-190 at 750 m to 181-183 dB re $1 \mu Pa^2$ at 3000 m distance.

Table 4.1 The minimum, maximum and nth percentiles of sound level metrics for A02 at 750 and 3000 m.

Fnd	Distance (m)	Height above bed	SEL_{ss} (dB re $1 \mu Pa^2 s$)					$cSEL$ (dB re $1 \mu Pa^2 s$)	SPL_{rms} (dB re $1 \mu Pa$)			L_{peak} (dB re $1 \mu Pa$)		
			Min	90	50	5	Max		Min	50	Max	Min	50	Max
A02	750	1 m	151	154	161	163	166	192	156	167	173	166	177	182
		12 m	149	153	156	159	160	188	154	162	167	167	174	177
	3000	1 m	143	146	152	154	157	183	149	158	163	160	169	173
		12 m	143	145	150	153	154	181	147	156	162	160	166	173

Noise levels, SEL_{ss} and L_{peak} , for the individual piling blows are visualized in Figure 4.1 for both hydrophone depths in black (1 m above the seabed) and in blue (12 m above the seabed). Continuous sound levels (L_{eq}) calculated over 30 seconds are shown over the full piling period as dashed lines and show the difference between periods that include and not include piling noise. Solid lines represent the cumulative sound exposure levels ($cSEL_{LW}$) during the piling period.

Measured broadband sound exposure levels (SEL_{ss} , Figure 4.1) are sufficiently elevated (>10 dB) above the noise floor, before, after and during breaks in the piling procedure. This ensures a sufficient signal-to-noise ratio (SNR) to detect the pile driving peaks.

Some disturbance in the anchor set-up of the system at the higher hydrophone deployed at 3000 m distance, results in an elevated background noise level. This elevated background level, however, has minimal impact on the SEL_{ss} , the difference is only less than 10 dB in the first 15 minutes of the piling procedure. Sound pressure levels calculated over 30 seconds are calculated per decade frequency band and visualized in Figure 4.2.



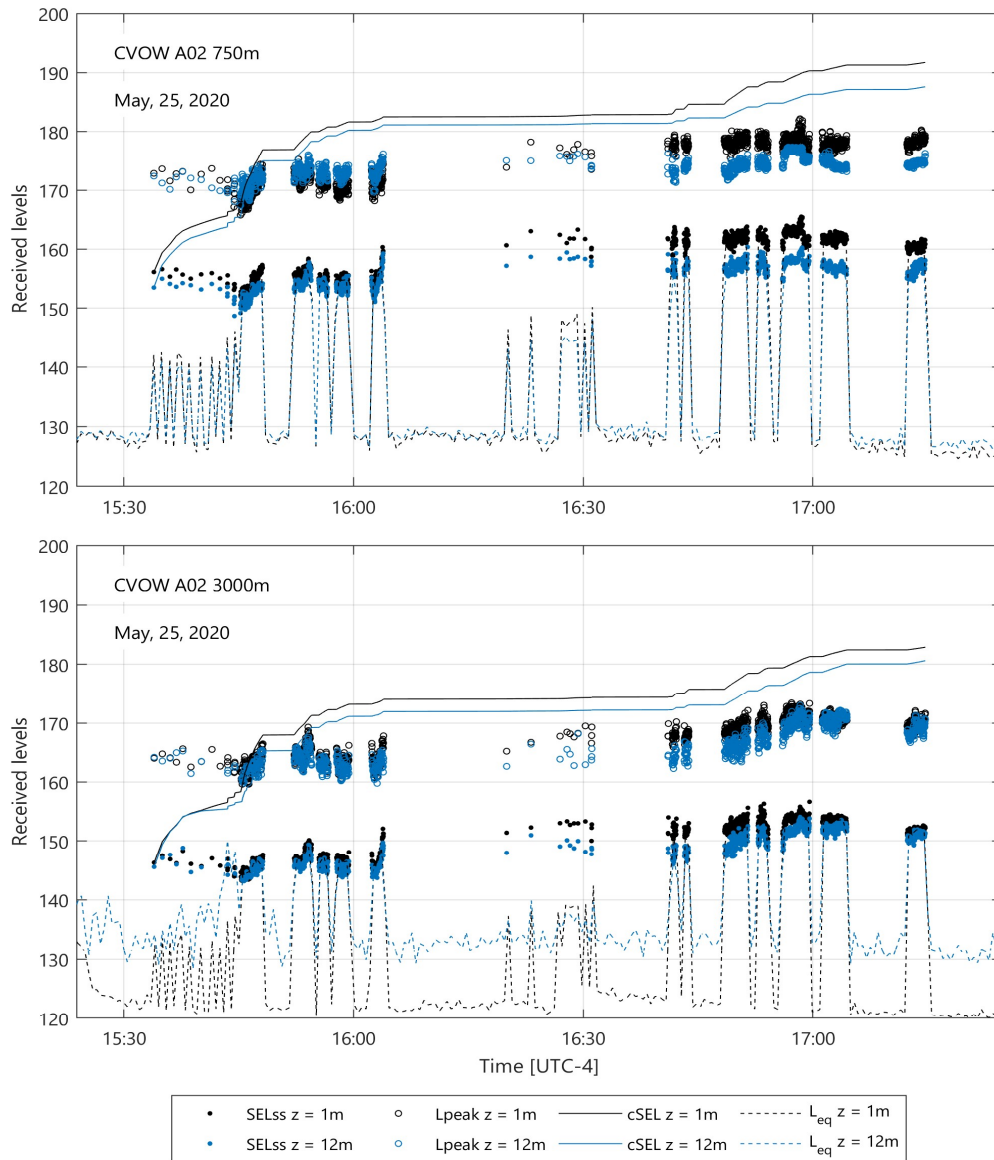


Figure 4.1 Sound levels measured at a distance of 750 and 3000 m, during pile driving monopile foundation A02. Units for SEL_{ss} and $cSEL$ are in dB re $1 \mu Pa^2s$, for L_{peak} and L_{eq} in dB re $1 \mu Pa$.



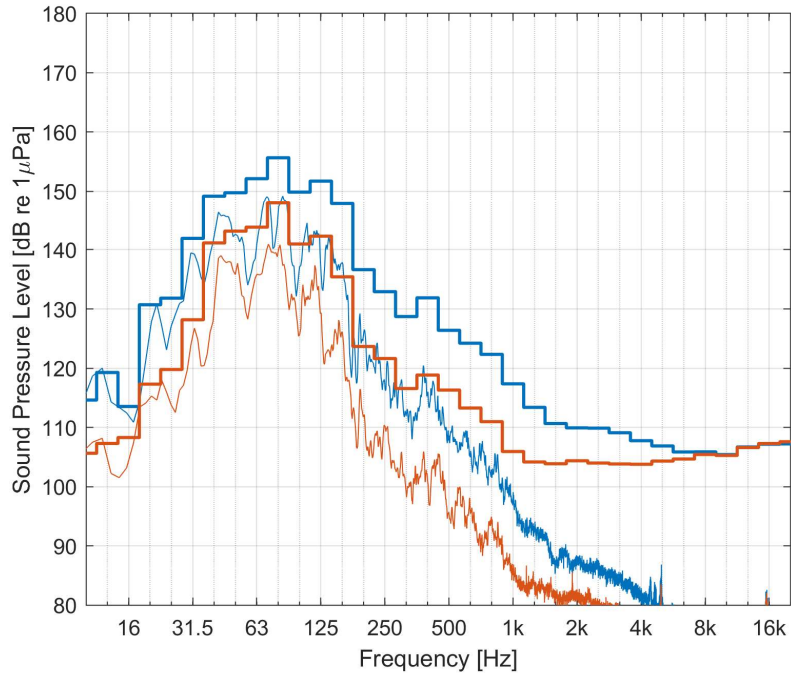


Figure 4.2 Sound pressure level in decade and narrow frequency bands averaged over 30 seconds at (blue) 750 m and (red) 3000 m distance from piling location A02. The averaging block was taken around 17:13 (UTC-4) and contained 27 detected piling blows (blowrate=54 blows/min).

During the second half of the piling procedure (from 16:40), sound levels at the lower and higher hydrophone start to deviate at 750 m distance. The difference in SEL_{ss} is up to 6 dB re $1\mu Pa^2s$, which is higher than differences that were typically observed in earlier studies. This is also reflected in the statistics in Table 4.1. It is unclear what caused the sound levels to deviate in the second half of the piling sequence, a smaller deviation was also observed at 750 m during the installation of the second foundation A01.

To calculate frequency weighted sound exposure levels, only the levels of the individual piling blows were included when these exceeded the background level at the particular frequency. This is illustrated in Figure 4.3, which shows the 5% exceedance value of the unweighted SEL (blue line) for each decade frequency band. At 750 m distance, the 5% exceedance value exceeds the background level for all frequencies, while at 3000 m this is only true up to 4 kHz. The resulting frequency weighted cSEL values are included in Table 4.2.

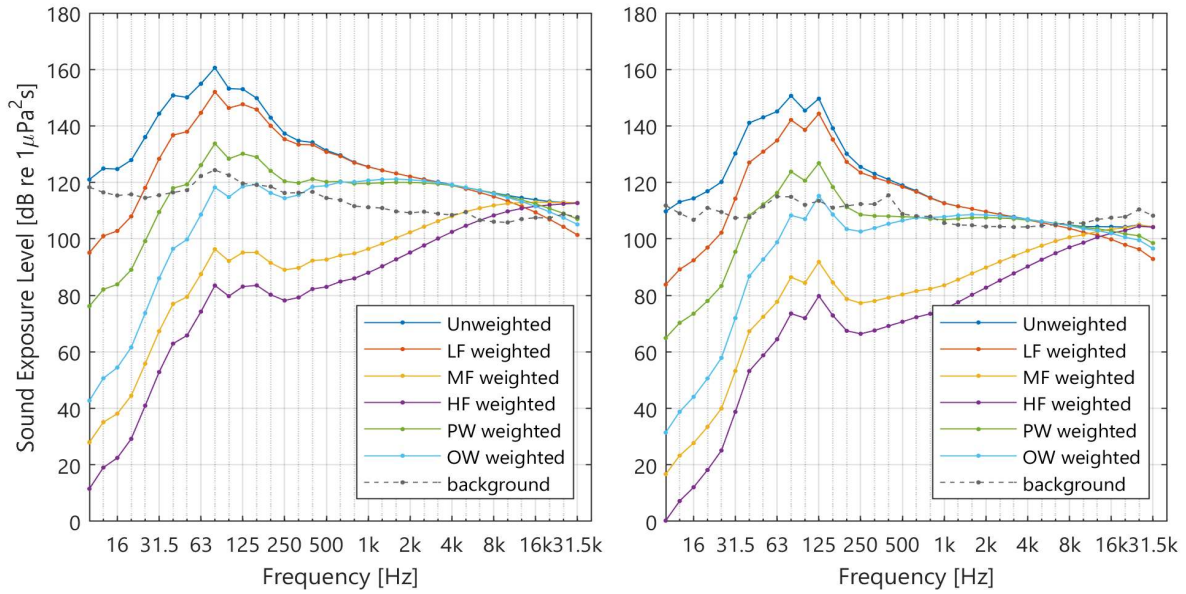


Figure 4.3 The 5% exceedance values of the sound exposure level for the decade frequency bands for the individual piling blows at (left) 750 m and (right) 3000 m distance from piling location A02. In grey the background noise level.

Table 4.2 Weighted cumulative sound exposure levels for A02 at 750 and 3000 m.

Fnd	Distance (m)	Height above bed	cSEL (dB re 1 μPa² s)					
			unweighted	LF	MF	HF	PW	OW
A02	750	1 m	192	183	149	147	166	160
		12 m	188	179	148	146	163	158
	3000	1 m	183	175	128	121	157	148
		12 m	181	172	127	122	154	145



4.1.2 Monopile A01 without mitigation

The second monopile foundation, A01, was installed without the operation of a bubble curtain. Instruments were deployed in northward direction at 750, 1500, 3000 and 4900 m, with an additional station at 750 m for contingency (see section 3.1.2). The additional measurements at 750 m were fairly similar to the sound levels recorded at 750 m in northward direction (Table 4.3) and are therefore not further discussed.

Table 4.3 The minimum, maximum and nth percentiles of sound level metrics for A01 at 750, 750 (extra), 1500, 3000 and 4900 m.

Fnd	Distance (m)	Height above bed	SEL _{ss} (dB re 1 μPa ² s)					cSEL (dB re 1 μPa ² s)	SPL _{rms} (dB re 1 μPa)			L _{peak} (dB re 1 μPa)		
			Min	90	50	5	Max		Min	50	Max	Min	50	Max
A01	750	1 m	165	167	170	173	174	202	171	180	183	182	190	193
		12 m	162	165	167	168	171	199	171	177	180	183	187	190
	750 (2)	1 m	167	170	172	174	176	204	173	182	186	187	191	194
		12 m	162	165	167	168	171	199	170	177	180	183	187	190
	1500	1 m	161	163	165	166	168	197	170	174	177	179	183	187
		12 m	158	162	163	165	167	195	168	174	176	177	182	186
	3000	1 m	155	158	160	161	163	191	163	169	172	172	178	182
		12 m	154	157	159	160	162	191	162	168	171	172	178	182
	4900	1 m	150	153	154	156	158	186	158	163	166	167	173	176
		12 m	150	153	155	156	158	186	160	164	168	168	174	178

Broadband and unweighted sound exposure levels (SEL_{ss}) were between 162 and 174 dB re 1 μPa²s at 750 m and decreased to values between 150 and 158 dB re 1 μPa²s at 4900 m (Table 4.4). These exposure levels are well above the noise floor (120-130 dB re 1 μPa) at both locations (Figure 4.4). The unweighted cumulative level (cSEL_{uw}) for the 1558 blows decreased from 199-202 at 750 m to 186 dB re 1 μPa² at 4900 m distance.

Noise levels, SEL_{ss} and L_{peak}, for the individual piling blows are visualized in Figure 4.4 for both hydrophone depths in black (1 m above the seabed) and blue (12 m above the seabed). Continuous sound levels (L_{eq}) calculated over 30 seconds are shown over the full piling period as dashed lines and show the difference between periods that include and exclude piling noise. Solid lines represent the cumulative sound exposure levels (cSEL_{uw}) during the piling period. As observed during the installation of A02, a difference between the two vertically spaced hydrophones occurs in the last hour of pile driving. Noise levels are slightly larger close to the bed, the difference between the hydrophones reduces with distance from the piling location.

Sound levels in the decade frequency bands at 750 m exceed the background level over the entire frequency range for the loudest 5% of the peaks (Figure 4.6). The measurement station at 4900 m distance, records 95% of the exposure levels related to piling noise to be below the background level at



frequencies higher than 16 kHz. The high levels in the higher frequencies directly relates with the absence of the bubble curtain during the installation of this foundation, as bubble curtains are most effective in reducing levels at higher frequencies (Bellmann, 2014). That these higher levels exceed the background level beyond the frequency range of the hydrophone setup only minimally affect calculated broadband and low-frequency weighted values, but cumulative values for the mid and high-frequency range ($cSEL_{mf}$ and $cSEL_{hf}$) are underestimated here (Table 4.4). At a distance of 4900 m, the piling noise levels are below the background level for frequencies above 16 kHz and here mid and high-frequency weighted values are thus accurate.

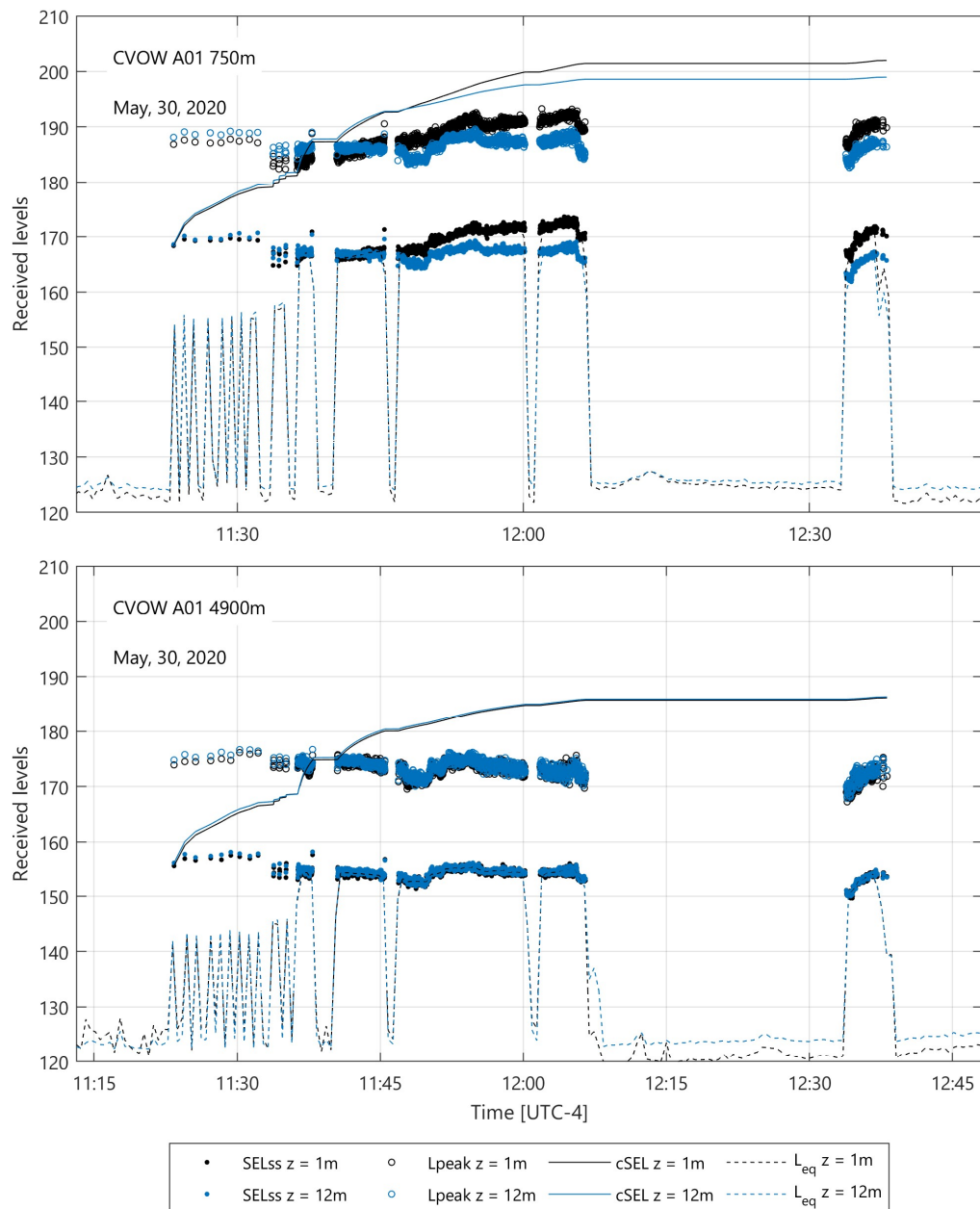


Figure 4.4 Sound levels measured at a distance of 750 and 4900 m, during pile driving monopile foundation A01. Units for SEL_{ss} and cSEL are in dB re 1 μPa^2s , for L_{peak} and L_{eq} in dB re 1 μPa .



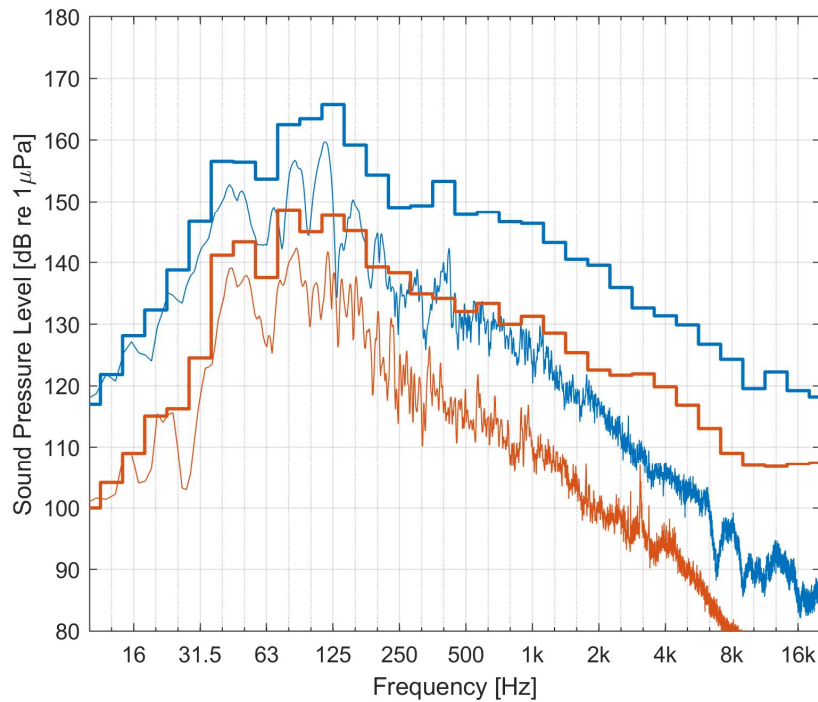


Figure 4.5 Sound pressure level in decidecade and narrow frequency bands averaged over 30 seconds at (blue) 750 m and (red) 4900 m distance from piling location A01. Averaging block was taken around 12:36 (UTC-4) and contained 28 detected piling blows (blowrate=56 blows/min).

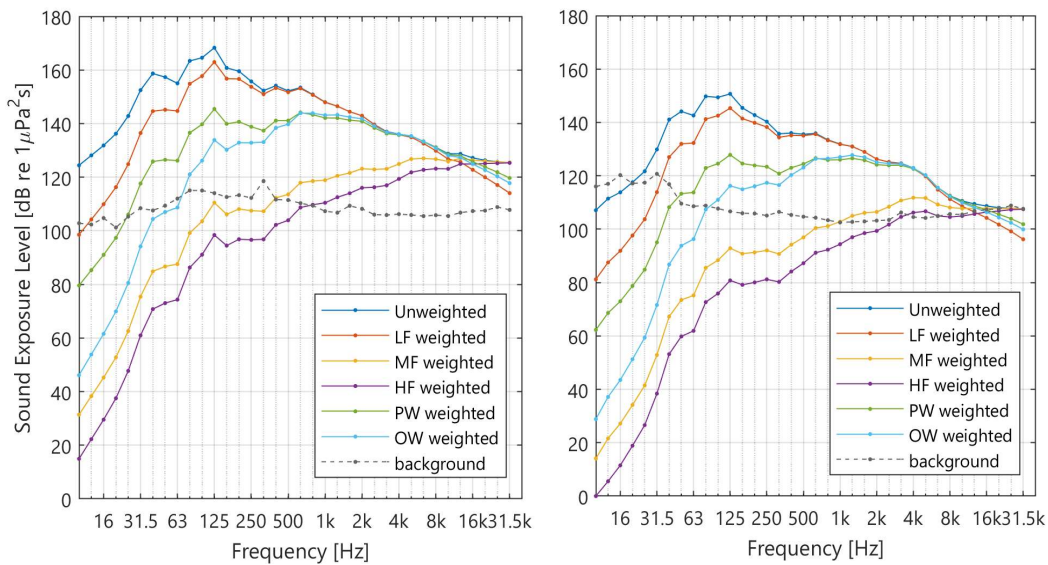


Figure 4.6 The 5% exceedance values of the sound exposure level for the decidecade frequency bands for the individual piling blows at (left) 750 m and (right) 4900 m distance from piling location A01. In grey the background noise level.



Table 4.4 Weighted cumulative sound exposure levels for A01 at 750, 750 (2), 1500, 3000 and 4900 m.

Fnd	Distance (m)	Height above bed	cSEL (dB re 1 μ Pa ² s)					
			unweighted	LF	MF	HF	PW	OW
A01	750	1 m	202	196	166	162	183	181
		12 m	199	193	165	161	181	180
	750 (2)	1 m	204	197	166	162	183	181
		12 m	199	192	165	162	180	180
	1500	1 m	197	190	160	156	177	176
		12 m	195	188	158	155	175	174
	3000	1 m	191	184	154	150	171	170
		12 m	191	184	155	151	170	169
	4900	1 m	186	180	149	145	166	165
		12 m	186	179	148	144	165	164

4.2 DISTANCES TO THRESHOLDS

4.2.1 Monopile A02 with dBBC

The acoustic model to simulate transmission losses was calibrated based on the measured data and subsequently used to estimate distances to disturbance and injury thresholds for fish, turtles and marine mammals. The distances to these thresholds are shown together with the measured and simulated sound levels in Figure 4.7. Except for the distances to the $SPL_{rms} = 150$ dB re 1 μ Pa (disturbance of fish) and $SPL_{rms} = 160$ dB re 1 μ Pa (level B harassment of marine mammals), all threshold levels are smaller than the level measured at 750 m or in between the measured levels at 750 m and 3000 m. This means the estimated distances to these thresholds are relatively accurate, uncertainties in the sound levels mainly exist beyond the range where measurements were conducted (i.e. for distances > 3000 m).



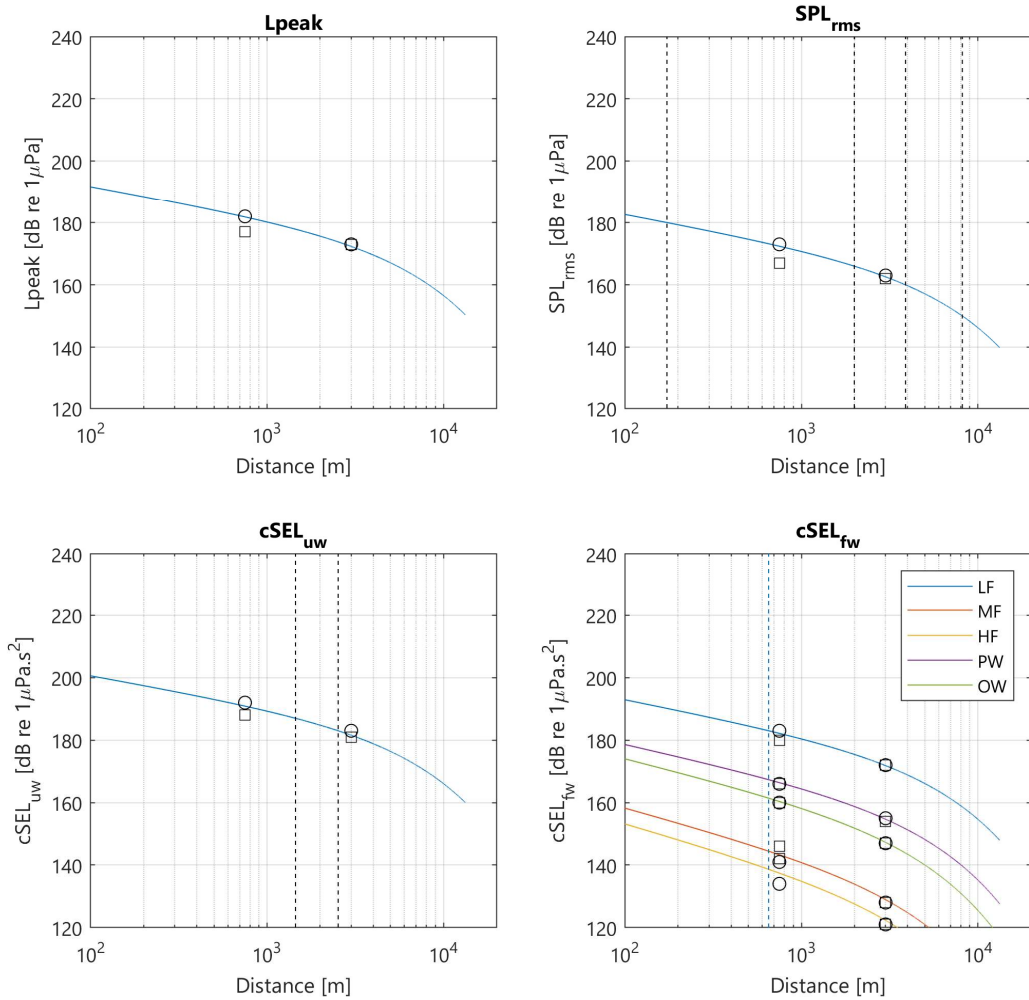


Figure 4.7 Estimation of distances to thresholds for L_{peak} , SPL_{rms} , $cSEL_{uw}$ and $cSEL_{fw}$ during the installation of A02. Vertical dashed lines represent calculated distances for Table 4.5 and Table 4.6.

Table 4.5 Estimated distances to disturbance and injury noise thresholds for fish, marine mammals and sea turtles during the installation of A02. The pre-NOAA level A harassment threshold was in use before the definition of thresholds for the individual hearing groups (Section 3.2.2). Distances smaller than 100 m are within the extent of the bubble curtains.

Fnd			SPL_{rms} (dB re $1 \mu Pa$)	cSEL (dB re $1 \mu Pa^2 s$)	L_{peak} (dB re $1 \mu Pa$)	Distance (m)
A02	Fish	Disturbance	150	-	-	8164
		Injury (small fish)	-	183	-	2529
		Injury (large fish)	-	187	-	1450
	Marine Mammals	Pre-NOAA Level A Harassment	180	-	-	173
		Level B Harassment	160	-	-	3891



	Sea Turtles	Disturbance	166	-	-	1993
		Injury	180	-	-	173
		Potential mortal injury	-	210	-	<100
		Potential mortal injury	-	-	207	<100

Table 4.6 Estimated distances to noise thresholds for the different marine mammal hearing groups. (*Otariid Pinnipeds do not occur in the project area). Distances smaller than 100 m are within the extent of the bubble curtains.

Fnd	PTS onset	Threshold L_{peak} (dB re 1 μ Pa)	Distance (m)	Threshold weighted cSEL (dB re 1 μ Pa ² s)	Distance (m)
A02	Low-Frequency (LF) Cetaceans	219	<100	183	652
	Mid-Frequency (MF) Cetaceans	230	<100	185	<100
	High-Frequency (HF) Cetaceans	202	<100	155	<100
	Phocid Pinnipeds (PW) (Underwater)	218	<100	185	<100
	Otariid Pinnipeds (OW) (Underwater) *	232	<100	203	<100

Determined distances for disturbance and injury of fish, turtles and marine mammals are summarized in Table 4.5 and Table 4.6. The distances that are smaller than 100 m are not further specified, as these are within the extent of the outer bubble curtain. Estimates for actual distances within the extent of the bubble curtain can be attained from the results for monopile A01, which was installed without noise mitigation measures. Distances to sound levels that can cause injury are max. 2.5 km for fish, 0.2 km for turtles and max. 0.7 km for marine mammals. Except for the low-frequency cetaceans, the zone where the sound levels are exceeding the PTS threshold are contained within the outer bubble curtain.

4.2.2 Monopile A01 without mitigation

Unweighted and frequency-weighted sound levels were significantly larger during the installation of monopile foundation A01, for which a bubble curtain was not used. This was the reason to extend the measurement array from 3000 m for A02 to 4900 m for A01. The $SPL_{rms} = 150, 160, 166$ dB re 1 μ Pa and $cSEL_{uw} = 183$ dB re 1 μ Pa²s (Table 4.7) did exceed the range of 4900 m and the determined distances for these values thus have a higher uncertainty.



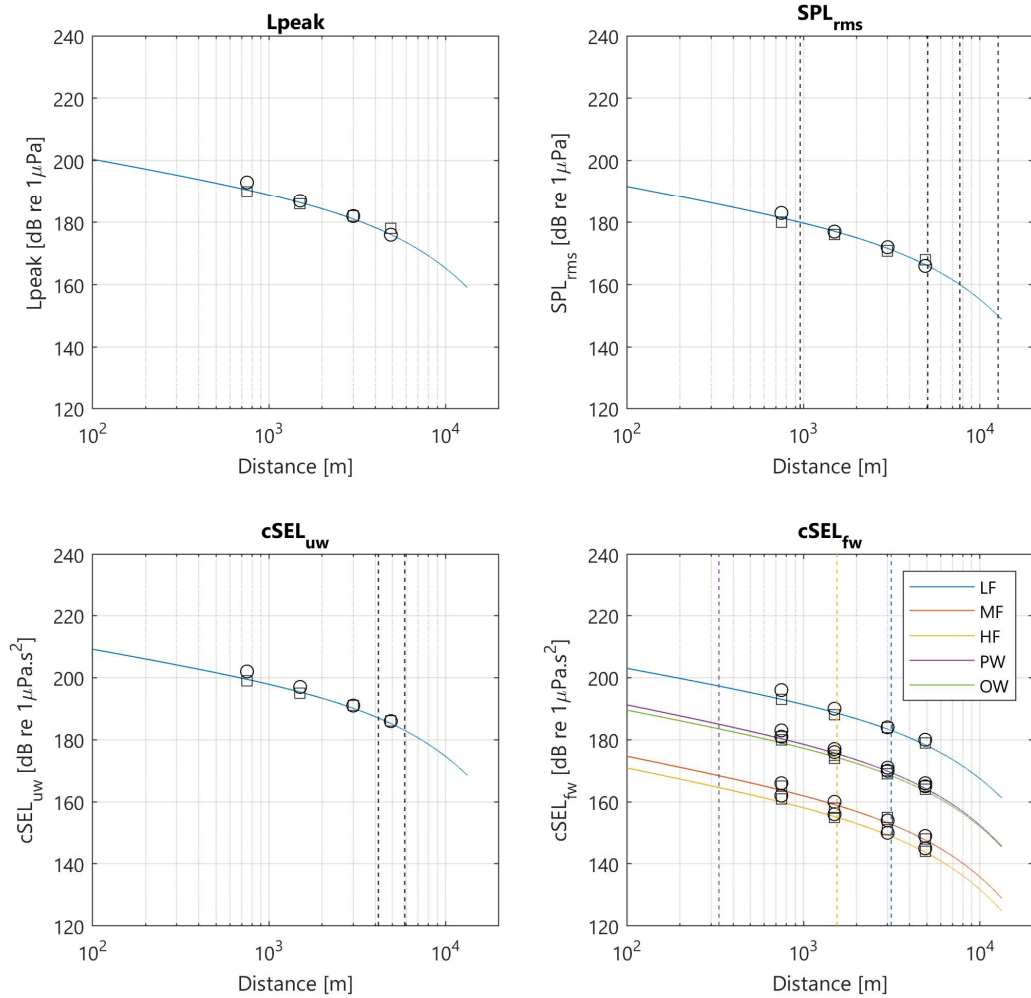


Figure 4.8 Estimation of distances to thresholds for L_{peak} , SPL_{rms} , $cSEL_{uw}$ and $cSEL_{fw}$ during the installation of A01. Vertical dashed lines represent calculated distances for Table 4.7 and Table 4.8.

Table 4.7 Estimated distances to disturbance and injury noise thresholds for fish, marine mammals and sea turtles during the installation of A01. The pre-NOAA level A harassment threshold was in use before the definition of thresholds for the individual hearing groups (Section 3.2.2).

Fnd			SPL_{rms} (dB re $1\mu Pa$)	cSEL (dB re $1\mu Pa^2 s$)	L_{peak} (dB re $1\mu Pa$)	Distance (m)
A01	Fish	Disturbance	150	-	-	12684
		Injury (small fish)	-	183	-	5873
		Injury (large fish)	-	187	-	4166
	Marine Mammals	Pre-NOAA Level A Harassment	180	-	-	958
		Level B Harassment	160	-	-	7704
	Sea Turtles	Disturbance	166	-	-	5069



		Injury	180	-	-	958
		Potential mortal injury	-	210	-	83
		Potential mortal injury	-	-	207	23

Table 4.8 Estimated distances to noise thresholds for the different marine mammal hearing groups. (*Otariid Pinnipeds do not occur in the area)

Fnd	PTS onset	Threshold L_{peak} (dB re 1 μ Pa)	Distance (m)		Threshold weighted cSEL (dB re 1 μ Pa ² s)	Distance (m)
A01	Low-Frequency (LF) Cetaceans	219	2		183	3143
	Mid-Frequency (MF) Cetaceans	230	<1		185	12
	High-Frequency (HF) Cetaceans	202	71		155	1550
	Phocid Pinnipeds (PW) (Underwater)	218	2		185	332
	Otariid Pinnipeds (OW) (Underwater)*	232	<1		203	6

Without the use of a bubble curtain, distances to disturbance and injury threshold are increased significantly (Table 4.7 and Table 4.8). Distances to sound levels that can cause injury are max. 5.9 km for fish, 1.2 km for turtles and max. 3.1 km for marine mammals. The distances to a threshold defined as a cumulative sound exposure level are based on a level that would accumulate if fish, turtles or marine mammals would remain in the same position throughout the piling procedure. This is a conservative estimate, as in reality fish, turtles and marine mammals will increase their distance to loud sound sources over time, if necessary.

4.3 EFFECTIVENESS OF NOISE MITIGATION MEASURES

The large difference between noise levels and impact distances between A02 and A01 are caused by the application of a double Big Bubble Curtain (dBBC) during the installation of monopile A02 and the absence of noise mitigation measures during the installation of A01. See Section 2 for a description of the deployed noise mitigation system.

The effectiveness of the bubble curtains to reduce noise levels is discussed here by comparing measured levels during both monopile installations. This comparison gives an indication of noise level reductions that can be achieved. There are, however, more factors involved in noise level variability and their impact cannot be separated statistically based on a comparison between only two foundation installations.

Underwater noise levels during the installation of a monopile foundation are related strongest to the size of the monopile, the piling energy, soil resistance and the piling procedure. The piling energy versus depth-averaged measured SEL for both monopiles is visualized in Figure 4.9. The piling procedures that were used to install both monopiles differ considerably. While monopile A01 was installed with a gradual



increase of the piling energy after the soft start, the piling energy during the installation of monopile A02 was varied throughout the piling procedure. The variability in noise levels over short timespans can be explained by varying blow energy (Figure 4.9), and generally there is an increase in noise levels with increasing blow energy (Figure 4.10).

The blow energy is, however, not the sole variable that affects SEL values, as becomes clear from the large spread within classes of blow energy and the overlap between these classes (Figure 4.10).

Values during the soft start (the first approx. 10 blows) show higher noise values than would be expected based on the blow energy, especially for A01. This is measured more often and can sometimes be ascribed to a high resistive upper soil layer, here it is unclear what causes these higher levels. In a recent extensive study (Bellmann et al., 2020) that used a large dataset of measurements collected during impulse pile driving events, a consistent explanation for the occasional higher levels during the soft start could also not be found.

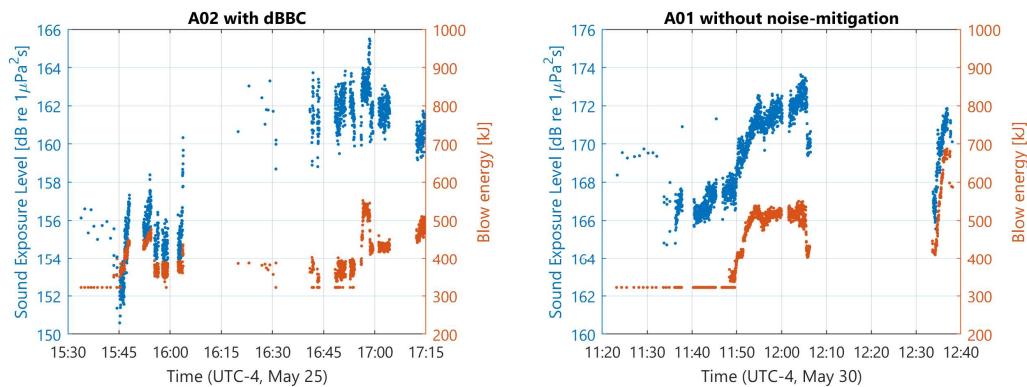


Figure 4.9 The single-strike sound exposure levels and blow energy for A02, with dBBC, and A01, without noise mitigation. The shown sound exposure levels are depth-averaged.

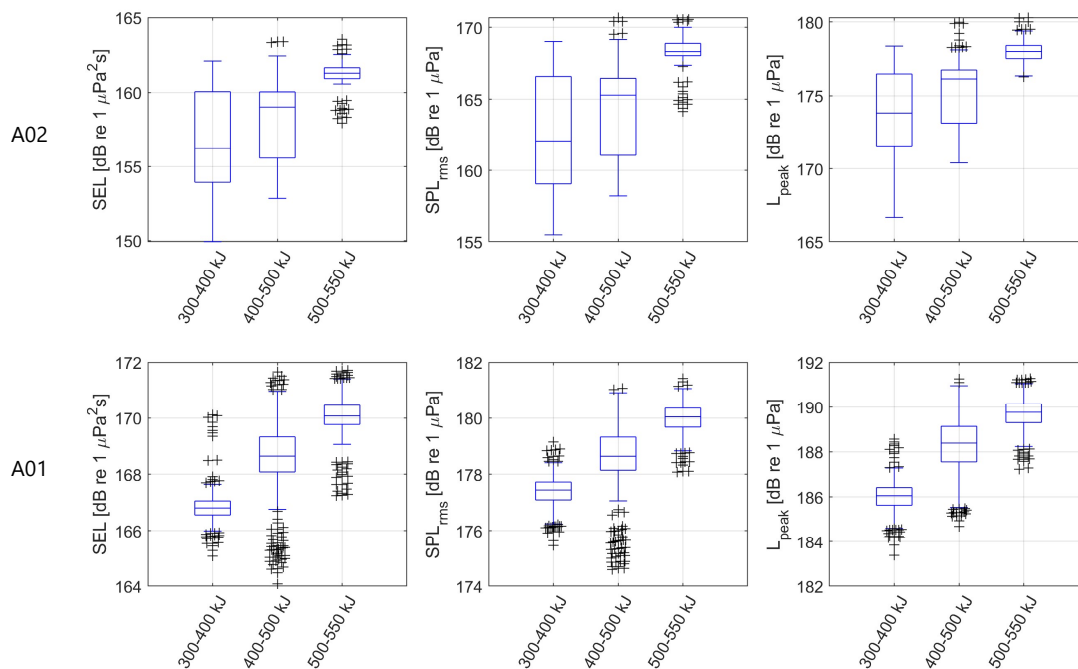


Figure 4.10 Variability of noise metrics in three classes based on the blow energy. The lines in the boxplots show the 1st, 25th, 50th, 75th and 99th percentile, outliers are shown separately as black crosses.



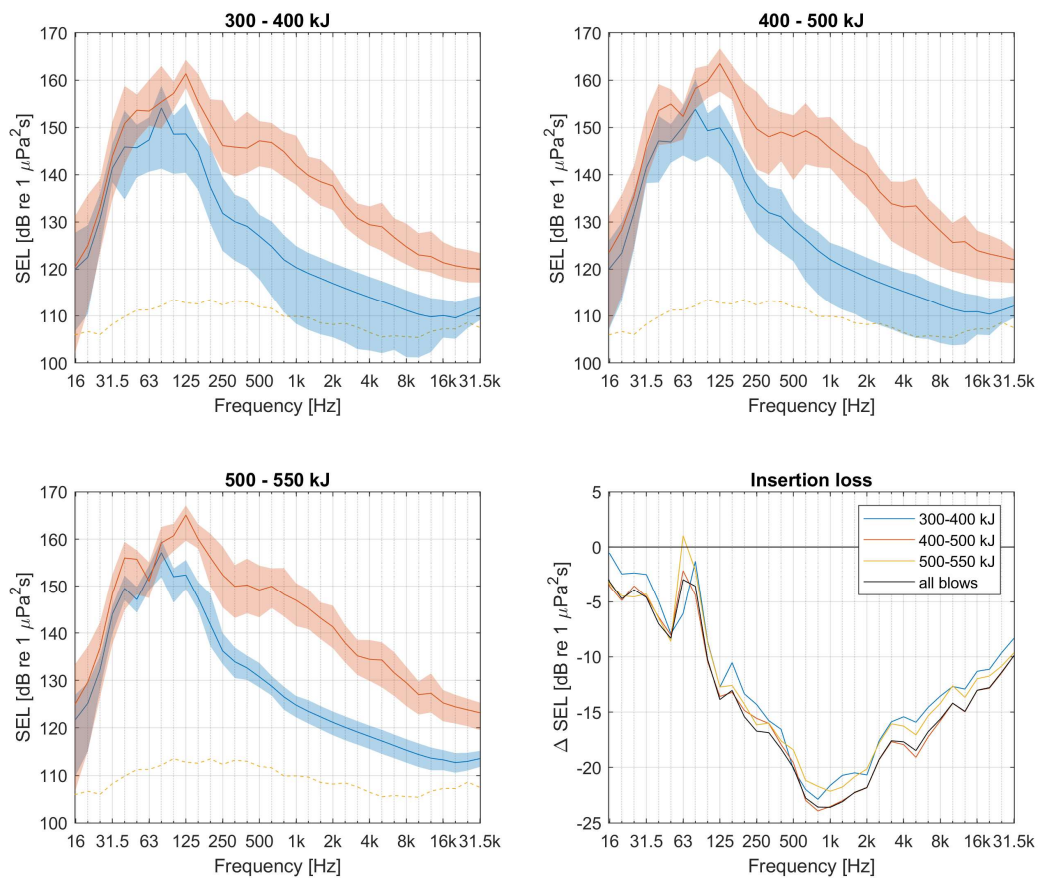


Figure 4.11 The mean and range in depth-averaged sound exposure level in decidecade frequency bands for (blue) A02 and (red) A01 for blows divided in three classes. The yellow dashed line represents the background (noise floor) level during A02. And (right-bottom) the difference between mean values for A02 and A01.

The division of individual blows in three different classes of blow energy is also used to estimate the effectiveness of the dBBC in reducing noise levels during the installation of A02. SEL values in the decidecade frequency bands, analogues to the broadband levels, increase with higher blow energy classes, but spectral shapes remain very similar. The effectiveness of the dBBC as a noise mitigation measure is frequency dependent and reaches a maximum around 1 kHz (Figure 4.11). The frequency dependent insertion loss of the dBBC is consistent over the different classes in piling energy and increases from 5 dB at 16 Hz to 23 dB at 1 kHz.

The decrease in insertion loss around 80 Hz is caused by a difference in the peak frequency between piling noise measured at A02 and A01 and is not related to dBBC effectiveness.

The difference between SEL values in the decidecade bands decreases for frequencies > 1 kHz. This decrease is explained by the relatively low energy level in higher frequencies emitted from a piling location, and piling noise levels at A02 being below the background noise level at higher frequencies.

The effectiveness of the dBBC to reduce broadband noise levels is estimated as the reduction in median levels across the three classes in blow energy (Table 4.9). Reductions are again similar across classes in blow energy, only the reductions in SPL_{rms} vary more than 2 dB across classes. The SPL_{rms} is calculated over the time duration in which 90% of the peak energy is present, the application of a bubble curtain typically increases this duration as the peak energy is more spread out in time, resulting in decreased SPL_{rms} values. This explains higher reductions for the SPL_{rms} values in comparison with the SEL values,

which are less sensitive to the peak duration. The duration which contains 90% of the peak energy is also larger for piling noise levels that are closer to the background (or noise floor) level, this explains the higher reduction for SPL_{rms} values in the low blow energy classes.

Reductions in broad band levels are generally around 9 – 15 dB (Table 4.9). The reduction in frequency weighted SEL_{pw} is larger (around 20 dB), as the auditory frequency weighting function for phocid pinnipeds is centered at the frequencies where the largest reductions are measured.

Table 4.9 Differences between median noise levels between A02 and A01, for three classes in blow energy.

	SEL	SPL _{rms}	L _{peak}	SEL _{lf}	SEL _{mf}	SEL _{hf}	SEL _{pw}	SEL _{ow}
Median reduction [dB] 300 - 400 kJ	-10.6	-15.4	-12.2	-11.3	-14.2	-12.7	-20.8	-14.9
Median reduction [dB] 400 - 500 kJ	-9.4	-13.2	-12.0	-11.3	-14.1	-12.8	-19.5	-15.2
Median reduction [dB] 500 - 550 kJ	-8.8	-11.7	-11.7	-10.8	-13.9	-12.7	-19.0	-14.7

The application of the dBBC during the installation of A02 thus significantly reduced far-field piling noise levels. This is also reflected in the estimated distances to noise thresholds for disturbance and injury of fish, marine mammals and sea turtles (Table 4.10). As the distances to these thresholds are reduced considerably, the affected areas in which the thresholds are exceeded are diminished by 58 – 100 %.

Table 4.10 Modeled distances to thresholds for the installation of A02 and A01 (see also Table 4.5 - Table 4.8) and the reduction in impacted area in percentage.

			A01 Distance (m)	A02 Distance (m)	Reduction area [%]
Fish	Disturbance		12684	8164	58.6
	Injury	Small fish	5873	2529	81.5
		Large fish	4166	1450	87.9
Marine Mammals	PTS onset	Low-Frequency (LF) Cetaceans	3143	652	95.7
		Mid-Frequency (MF) Cetaceans	12	<100	n.a.
		High-Frequency (HF) Cetaceans	1550	<100	>99.6
		Phocid Pinnipeds (PW) (Underwater)	332	<100	>90.9
		Otariid Pinnipeds (OW) (Underwater)*	6	<100	n.a.
	Pre-NOAA Level A Harassment		958	173	96.7



	Level B Harassment		7704	3891	74.5
Sea Turtles	Disturbance		5069	1993	84.5
	Injury		958	173	96.7
	Potential mortal injury		23 / 83	<100	n.a.

In comparison with statistical analysis of piling noise monitored during the installation of over 150 piles (Bellmann et al., 2020) in water depths of >25 m and with double Big Bubble Curtains with applied air volumes of >0.3 m³/(min·m), noise reductions observed here are lower than expected. The insertion loss of SEL values for optimized dBBC systems ranges between 14 and 18 dB, while here a reduction of only 9 – 11 dB was measured with supplied air volume 0.35 (+/- 0.03) m³/(min·m).

Reduction values reported for optimized dBBC systems are typically not achieved during the installation of the first pile of a project, as multiple deployments are needed for this optimization. There are multiple other factors that could explain the lower reduction values. The comparison between noise values at A01 and A02 is in-direct and between two piles only, this disables the possibility to exclude other factors that affect noise levels such as the piling regime and the local soil conditions.

Moreover, some technical challenges were encountered during the operation of the bubble curtain. During normal operations, both ends of the hoses are connected to the air compressors to supply air from both sides. During the installation of A02, however, only one end of the inner bubble curtain could be retrieved and used for air supply. Air was thus supplied from two sides for the outer bubble curtain, but from only one side for the inner bubble curtain. The air supply to both hoses was subsequently adjusted to ensure both bubble curtains fully encompassed the piling location. The air flow to the inner bubble curtain was, however, reduced to 82%, possibly reducing the effectiveness of the dBBC system.



5 CONCLUSIONS

Underwater sound levels were measured during the installation of the monopile foundations A02 and A01 of the Coastal Virginia Offshore Wind Pilot Project. The main difference between the measurements that were collected during the installation of these two foundations is caused by the difference in implemented noise mitigation measure. While foundation A02 was installed with a (non-optimized) double Big Bubble Curtain (dBBC), A01 was installed without such a measure and broadband sound exposure levels were 9 - 11 dB higher.

Distances to disturbance and injury thresholds for fish, turtles and marine mammals, during the installation of A01 and A02, were estimated using the measurements in combination with a transmission loss model. Distances to sound levels that can cause injury were max. 2.5 km for fish, 0.2 km for turtles and max. 0.7 km for marine mammals during A02, and max. 5.9 km for fish, 1.2 km for turtles and max. 3.1 km for marine mammals during the installation of A01.



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ANNEX B: PSO MONITORING FINAL REPORT



A.I.S., Inc.

Protected Species Monitoring Final Report

PROTECTED SPECIES MONITORING SERVICES DURING PILE DRIVING FOR OCS-A 0497

FINAL REPORT



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August 13, 2020

Confidentiality

The information summarized in this Final Report was collected by A.I.S., Inc. for Jan de Nul Dredging N.V. to be distributed to the National Marine Fisheries Service and the Bureau of Ocean Energy Management per the issued permit associated with the Coastal Virginia Offshore Wind (CVOW).

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1. INTRODUCTION

On April 1, 2015, the Commonwealth of Virginia, Department of Mines, Minerals and Energy was awarded the 2,135 acre lease area off the State of Virginia. Known as the Coastal Virginia Offshore Wind (CVOW) research project, this area is intended to demonstrate a grid-connected 12 megawatt (MW) offshore wind facility run by Dominion Energy Virginia (Dominion), 24 nautical miles east of Virginia Beach, Virginia. This offshore wind energy project falls within the Bureau of Ocean Energy Management (BOEM) Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf OCS-A 0497 (Lease) and export cable routes (Figure 1). The two installed 6 MW wind turbine generators (WTG), associated substation platform, inter-array cables and subsea export cable will ultimately provide the state of Virginia with renewable energy. The initial WTG were installed as part of an effort to explore new ways of lowering the cost of offshore wind as well as testing new and improved offshore wind technologies. The WTG are set to be fully operational by fall 2020 and at peak production will provide an estimated 3000 homes with renewable energy.

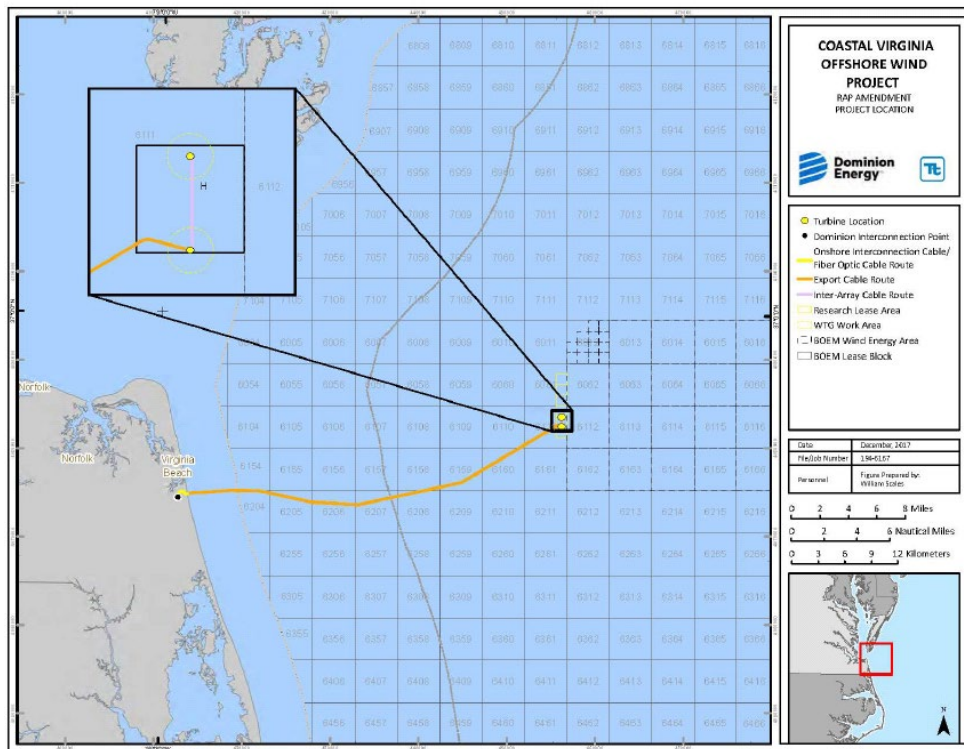


Figure 1 Location of Lease Area OCS-A-0497 and export cable route.

The following report summarizes protected species observation activities during pile driving operations associated with the installation of the two 6 MW turbine bases. Lease and IHA stipulations for pile driving require mitigation and monitoring for marine mammals and sea turtles. These protocols are summarized and approved in survey plans submitted to BOEM and National Marine Fisheries Service (NMFS) prior to the beginning of installation. In order to comply with these permits, Jan de Nul Dredging N.V. (JDN), contracted A.I.S. Inc. (AIS) to provide Protected Species Observers (PSO) and Passive Acoustic Monitoring (PAM) Operators to monitor for marine mammals and sea turtles during pile driving operations.

This report reviews the complete results from the May 2020 pile driving efforts associated with the Incidental Harassment Authorization (IHA) that was received by JDN and AIS from the Employer (Orsted Wind Power) on May 16th, 2020 in the afternoon for activities involving the use of pile driving equipment during construction conducted within the Lease. This report satisfies the IHA reporting requirement and summarizes the data contained in the separate vessel reports which are included as appendices for reference.

2. SUMMARY OF PILE DRIVING ACTIVITIES

The Offshore Installation Vessel (OIV) Vole au Vent was used to implement the pile driving operations over a two day period, which occurred on May 25th, 2020 and May 30th, 2020. The pile driving operations were in support of the installation of two monopiles associated with the two WTG to be installed in the Lease as part of the CVOW initiative led by Dominion. Due to the potential for harassment of marine mammals, sea turtles and Atlantic sturgeon as a result of the sound generated by the pile driving operations, three (3) PSO were deployed aboard OIV Vole au Vent, in accordance with the Research Activities Plan (RAP) and the NMFS issued Incidental Harassment Authorization (IHA). An additional three (3) PSO were deployed aboard a supporting/monitoring vessel M/V Berto Miller, along with a PAM system for acoustic monitoring during times of limited visibility. During the pile driving pre-watch operations, the Berto Miller circled the Vole au Vent at a distance of 1,750m to ensure complete coverage of the Exclusion Zone (Table 1) and initially assess visibility for the Vole au Vent team. After the one hour pre-clearance was complete, the Berto Miller transited in to 1,000m distance from the Vole au Vent to monitor for protected species during pile driving operations. For the period of operations associated with the first pile being driven, a double bubble curtain was deployed around the Vol au Vent to decrease the sound propagation of the pile being driven. This feature was absent during the second pile installation, ultimately increasing the monitoring zone to be monitored by the PSO teams from 3,830m to 5,930m (Figure 2). Due to the daylight only restrictions on the pile driving activities, the teams of PSOs aboard the two vessels worked in shifts to conduct mitigation monitoring accordingly. Pile driving was also prohibited from beginning within four hours of sunset.

3. PROTECTED SPECIES OBSERVATION METHODS

To fulfill the protected species monitoring requirements of (i) BOEM Lease OCS-A 0497, (ii) NMFS IHA and (iii) RAP, JDN contracted AIS to provide PSOs and PAM Operators to monitor for presence of marine mammals and sea turtles during pile driving operations. These monitoring activities were designed to minimize potential impacts of the pile driving operations and were completed in accordance with BOEM Lease stipulations and approved RAP. PSOs were on watch 24 hours per day during transit aboard the OIV Vole au Vent and Berto Miller and during daylight hours only on the days where pile driving operations were expected.

The mitigation and monitoring measures associated with the pile driving operations on the CVOW project were as follows:

- **Pile Driving Time Restrictions:** Pile driving must commence only during daylight hours at least four hours prior to sunset. Pile driving may continue after dark only when the installation of the same pile began during daylight when the Exclusion Zone was fully visible for at least 30 minutes. Pile driving activities must not occur between November 1 and April 30.
- **Strike Avoidance:** All vessels, regardless of length, must observe a 10-knot speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales, including any Dynamic Management Areas when in effect, and the Mid-Atlantic Seasonal Management Area (from November 1 through April 30). All vessel operators and crew maintained vigilant watch for cetaceans, pinnipeds, and sea turtles and slowed down or stopped their vessel to avoid striking these protected species; the following distances were maintained:
 - 500 meters (m) for North Atlantic right whales;
 - 100 m for non-delphinoid cetaceans;
 - 50 m for delphinoid cetaceans or pinnipeds
- **Pre-Clearance of Exclusion Zone:** The PSO team implemented a 60-minute pre-clearance period of the exclusion zones around the vessel prior to the initiation of pile driving operations. During this period the zones were monitored by PSOs using the appropriate visual technology. Pile driving was not initiated if any marine mammal or sea turtle was within its respective exclusion zone. If a marine mammal or sea turtle is entering or is

observed within the established Exclusion Zone within 30 minutes prior to commencement of pile driving, pile driving would be delayed. Pile driving may not commence until either the animal has voluntarily left and been visually confirmed beyond the Exclusion Zone or 15 minutes have elapsed without subsequent detection for delphinoids and pinnipeds, or 30 minutes have elapsed without subsequent detection for all other marine mammals or sea turtles.

- **Exclusion Zones:** PSOs established exclusion and monitoring zones prior to the start of operations, as follows:

Table 1 Summary of protected species mitigation zones for pile driving operations within Lease OCS-A-0497 conducted between May 25, 2020 and May 30, 2020.

	Exclusion Zone	Monitoring Zone (bubble curtain active)	Monitoring Zone (bubble curtain inactive)
North Atlantic Right Whale ¹	Any distance*	3,830m	5,930m
All other marine mammal species	1,750m	3,830m	5,930m
Sea Turtles	1,000m	3,830m	5,930m

* Any detection of a North Atlantic right whale, regardless of distance, resulted in an equipment shutdown.

- **Soft Start/Ramp Up:** Soft start requires contractors to provide an initial set of strikes at reduced energy. A soft start must be implemented at the start of each day’s impact pile driving and at any time following cessation of impact pile driving for a period of thirty minutes or longer. This process consisted of ten strikes at equal, low energy (~322kJ) over a ten minute period, prior to full power pile driving operations.
- **Shut-downs:** In the event that a whale or sea turtle was sighted within the exclusion zone during operations, an immediate shut down of pile driving operations was required. Activities must not resume until the animal has been confirmed to have left the area or the observation time period, as indicated above, has elapsed.
- **Post-Clearance of Exclusion Zone:** The PSO team implemented a 30-minute post-clearance period of the exclusion zones around the vessel after pile driving activities were deemed complete for the day. During this period the zones were monitored by PSOs using the appropriate visual technology, and any observed marine mammals or sea turtles were documented accordingly.

3.1 Protected Species Observer Training and Compliance

There were six (6) PSOs deployed on the two pile driving operation related vessels, two of which were dual certified as PAM Operators and located on the support/monitoring vessel. Each PSO was approved by NMFS and BOEM prior to the survey and were required to comply with JDN operating standards, possess fit-for-sea duty medical clearance, and offshore safety training. Additionally, all PSOs attended the Permit and Project Environmental Compliance Plan (PECP) training conducted by Tetra Tech, completed the required Orsted safety trainings, and received project specific training that covered the following topics:

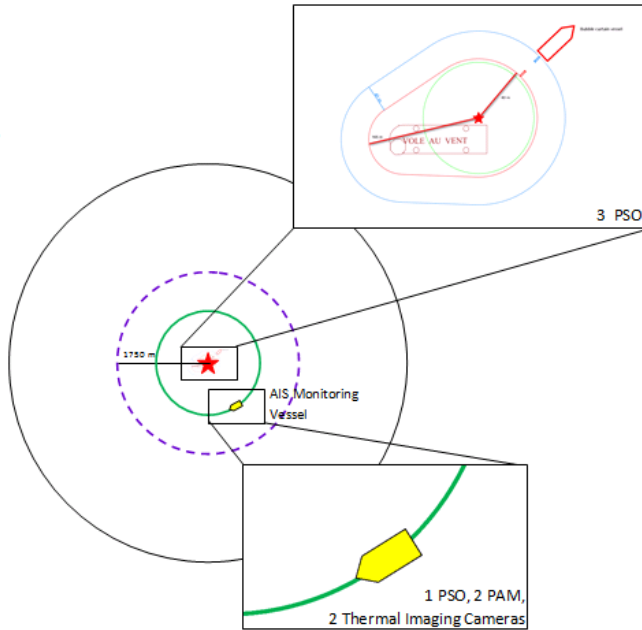
- Permits and plans relevant to the project
- Environmental compliance requirements;
- Health and safety requirements;
- PSO/PAM Operator requirements and scheduling;
- Protected species mitigation methods;
- Communication;
- Authorized takes;
- Data forms;
- Use and maintenance of PSO and PAM equipment;
- Protected species identification review.



**Protected Species Monitoring
Vessel Positioning for the Jan De
Nul Pile Driving Project**

Vole au Vent - 3 PSO
AIS Monitoring Vessel- 1 PSO, 2 PAM,
2 Thermal Imaging Cameras

Legend	
Zones	Distance from Pile Driving Vessel
Location of Pile Driving	★
Monitoring Vessel Position & Sea Turtle EZ	— 1000m
Marine Mammal EZ	— 1750m
Monitoring Zone	— 3830m



**Protected Species Monitoring
Vessel Positioning for the Jan De
Nul Pile Driving Project**

Vole au Vent - 3 PSO
AIS Monitoring Vessel- 1 PSO, 2 PAM,
2 Thermal Imaging Cameras

Legend	
Zones	Distance from Pile Driving Vessel
Location of Pile Driving	★
Monitoring Vessel Position & Sea Turtle EZ	— 1000m
Marine Mammal EZ	— 1750m
Monitoring Zone	— 5930m

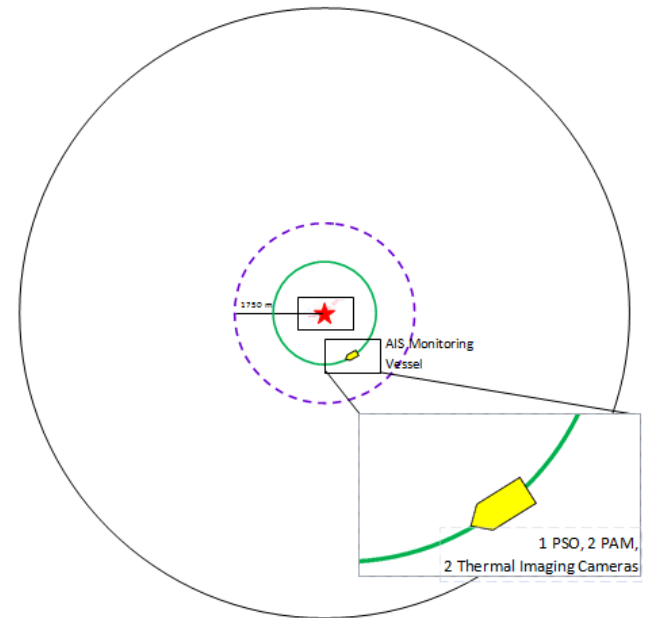


Figure 2 Summary of protected species mitigation zones for pile driving operations within Lease OCS-A-0497 conducted between May 25, 2020 and May 30, 2020. Left: Monitoring and mitigation zones in effect during the first pile driving operations on May 25th when the double bubble curtain was active. Right: Monitoring and mitigation zones in effect during the second pile driving operations on May 30th when the double bubble curtain was inactive.

3.2 Monitoring Methods and Equipment

PSOs and PAM Operators worked in shifts to ensure that each individual did not exceed four consecutive hours of watch and received a two hour break for every four hours of watch. Best efforts were made to ensure that no individual worked more than 12 hours in a 24-hour period. There were three (3) PSOs aboard the OIV Vole au Vent and three (3) PSO (two dual-rolled PSO/PAM operators) aboard the support/monitoring vessel M/V Berto Miller to fulfill protected species monitoring and mitigation requirements.

In accordance with the RAP, a minimum of two visual observers maintained a constant watch of the exclusion zone surrounding the vessel during daylight hours. Other than strike avoidance during transit of vessels to and from the construction site, there were no nighttime operations. As needed, hand-held night vision devices (NVD) were used during strike avoidance mitigation. PSO duties included:

- Visually monitoring the exclusion zone 360° around the construction vessel during piling for the presence of marine mammals and all other protected species during survey operations;
- Document all protected species sightings and environmental conditions on approved data forms and report all incidents to proper personnel;
- Recording operational activities during monitoring effort;
- Informing captain, or designated personnel, if a protected species is heading towards or enters the exclusion zone;
- Advising captain and crew on vessel speed restrictions and activities in the event of protected species detections;
- Summarizing daily monitoring effort and submitting data forms to the appropriate staff or database.

PSOs and PAM Operators recorded data on standard observation forms including details on survey operations, observer effort, environmental conditions, protected species sightings and incidents. PSOs regularly checked the whale alert app and the Right Whale Sighting Advisory System (RWSAS) for recent North Atlantic right whale sightings and established Dynamic Management Areas (DMAs) in the survey area. For each shift, a designated Lead PSO was responsible for communicating the presence of protected species to the offshore project manager and for communicating and enforcing appropriate mitigation actions.

Mitigation and Exclusion Zones were established based on the construction equipment being operated, BOEM Lease requirements and NMFS issued IHA requirements. A 60-minute clearance period for all marine mammals and sea turtles was conducted prior to starting any equipment. After the pre-watch clearance, a soft-start procedure was initiated by the OIV Vole au Vent in anticipation of pile driving. If animals entered the designated exclusion zone, all equipment was to be shutdown. The only exceptions to equipment shutdown were during active pile driving when the hammer became fully engaged and the safety of the vessel crew could be compromised by an immediate halt to operations.

A post-watch of 60 minutes was also conducted after the pile driving activities came to a close for the day. PSOs recorded data on standard observation forms including details on construction operations, observer effort, environmental conditions, protected species sightings and incidents. PSOs regularly checked the Right Whale Sighting Advisory System (RWSAS) for recent north Atlantic right whale sightings and established DMAs in the survey area.

For each shift, a designated Lead PSO was responsible for communicating the presence of protected species and for communicating and enforcing the appropriate mitigation actions. PAM operators communicated any detections to the lead PSO on duty to ensure the implementation of the appropriate mitigation measure.

Vessel-strike avoidance measures were implemented on all vessels conducting activities in support of Lease operations.

3.3 Visual Monitoring

Protected species monitoring methods included visual observations, as well as alternative monitoring for observations during nighttime hours and periods of reduced visibility. Alternative monitoring methods consisted of NVD. All equipment was calibrated daily.

The following visual PSO equipment was utilized during surveys:

- Bushnell Marine 7x50 waterproof binoculars with reticles;
- Big Eyes (25x and 40x long range binoculars);
- Rangefinders.

The following NVD alternative monitoring equipment was used for surveys at night:

- NVTS AN PVS-14 Mono-Goggle, Gen 3 AGM-HS Hand Select
- IR-K2 Extra Long Range Pro IR Illuminator (805nm) (Night Optics)
- FLIR Scout III 640 (640x512) Thermal Monocular

3.4 Passive Acoustic Monitoring

In addition to visual monitoring, PAM Operators were available to acoustically monitor the exclusion zone for protected species during times of reduced visibility during pile driving operations. The PAM equipment was deployed from the back deck of the support/monitoring vessel M/V Berto Miller. A total of 100m of PAM cable was deployed in the water and towed behind the vessel during times of limited visibility.

The PAM system consisted of an array of hydrophones with two broadband hydrophones (sampling mid-range frequencies of 2 to 200 kHz) and two low-frequency hydrophones (sampling range frequencies of 75 Hz to 30 kHz). The PAM Operators monitored acoustic signals in real-time, both aurally (using headphones), and visually (via sound analysis software). The low frequency signals are passed through the system without additional gain or filtering and can be selected for processing if ship noise permits. The audible band signals are amplified and filtered in the buffer unit and then connected to a multi-channel analogue-digital converter (ADC) which allows the signals to be distributed to the PAMGuard software as well as to an audio output system for the operator to monitor using headphones. The high frequency band signals are amplified and filtered and passed to a high-speed ADC, which passes the signals to PAMGuard software for processing, on a separate computer.

PAM was deployed and used only in anticipation of, and during required acoustic mitigation periods. All acoustic detections were communicated to the lead PSO on duty so that any required mitigation actions could be implemented. Constant communication between the PSO team and operations team were maintained throughout the course of the survey to ensure regulatory compliance. The PAM system set up on the M/V Berto Miller is further described in Appendix A.

4. PILE DRIVING SURVEY SUMMARY

4.1 Observer Effort

During daylight hours, visual observers maintained a constant watch of the exclusion zone. Daytime operations were monitored by PSOs conducting visual watches and with PAM during daytime fog conditions when the full exclusion zone could not be monitored visually. **Figure 3** provides a summary of PSO effort by monitoring method.

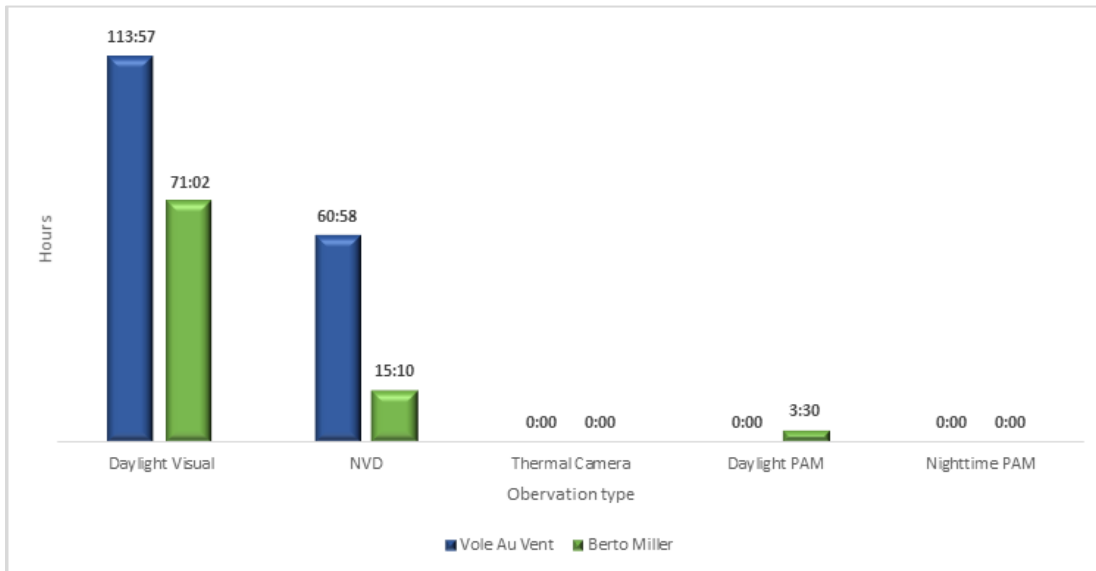


Figure 3 CVOW -1 Cumulative Monitoring Hours per Vessel by Observation Type

The PSO teams visually monitored the area surrounding operations for a total of 161 hours and 7 minutes. Figure 4 breaks down the amount of time spent monitoring per operational activity, with the majority of the time spent in transit. The OIV Vole au Vent spent a total of 152 hours and 27 minutes transiting between Halifax, Nova Scotia, Canada and the CVOW site. The M/V Berto Miller spent significantly less time transiting from Staten Island, NY to the CVOW site and in to Virginia Beach, VA upon demobilization.

Pre watch clearance represented 8 hours 44 minutes while soft starts protocol duration lasted 21 minutes. The piling activity for both locations combined amounted to 2 hours 36 minutes.

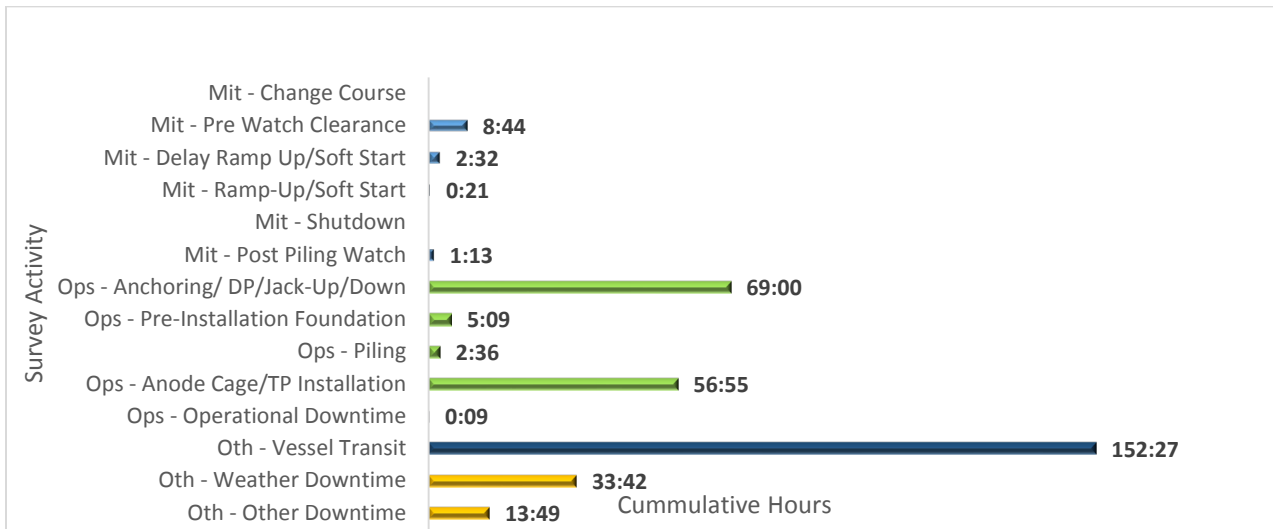


Figure 4. CVOW-1 Operational Activity Distribution by Time

4.2 Sighting and Detection Results

All protected species detections occurred during daylight hours. A total 61 detections for an estimated 271 individuals were encountered, between both vessels. 60 of these detections were visual sightings and 1 was an acoustic detection.

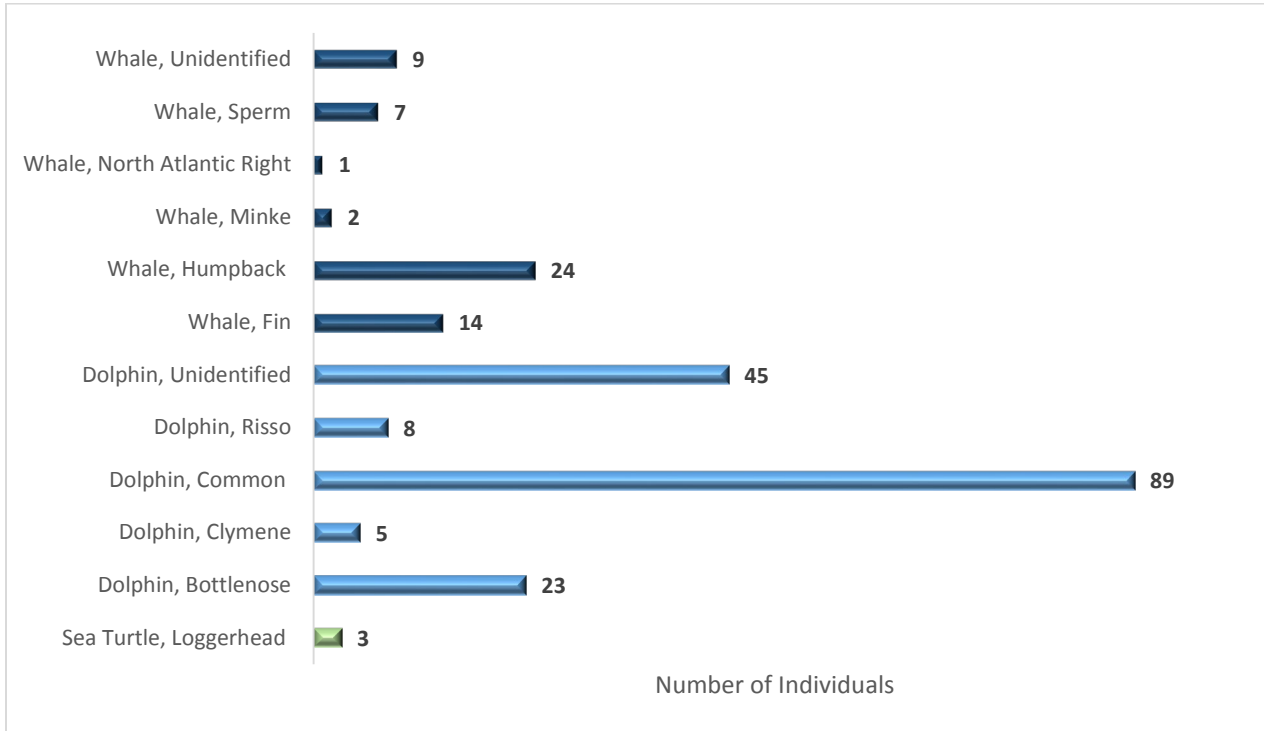


Figure 5 CVOW-1 Protected Species Detections by Number of Individuals from the Vole au Vent

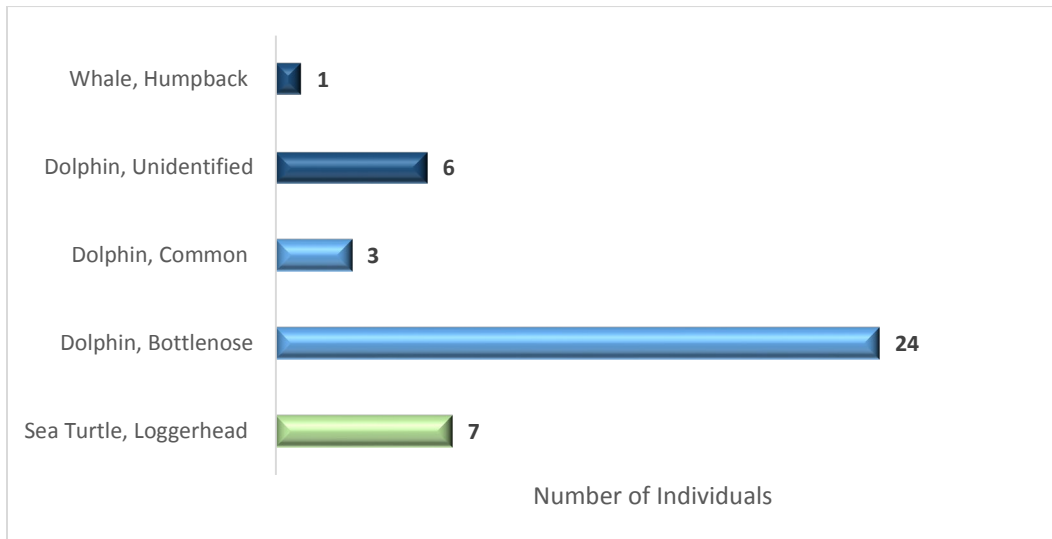


Figure 6 CVOW-1 Protected Species Detections by Number of Individuals from the Berto Miller

The most common species encountered was the common dolphin, *Delphinus delphis*, which were reported on both vessels.

Sightings deemed as ‘unidentified whale’ and ‘unidentified dolphin’ were labeled such due to the lack of identifying characteristics available to the observers at a distance of generally 1,000 meters or more.

One North Atlantic right whale (*Eubalaena glacialis*) (Figure 7) detection was made during transit to Halifax, from the CVOW site, aboard the OIV Vole au Vent on June 2nd, 2020. The sighting occurred post pile-driving operations, southeast of Nantucket. A large black body observed, possible callosities on lower lip, and a smooth concave fluke seen at

14:32. The whale was observed to be travelling away from the vessel. Only one single surfacing event was observed, and the sighting lasted but a few seconds. The sighting was reported to the client and ultimately NMFS.



Figure 7 North Atlantic right whale sighting aboard the OIV Vole au Vent on June 2nd, 2020

The PSO team aboard the OIV Vole au Vent also observed a pod of clymene dolphins (*Stenella clymene*) (Figure 8) during the same transit leg, on the same day. Initially observed directly off the bow, the group was sighted from above, by a PSO on the bridge, porpoising rapidly towards the vessel. The group then began bow riding and breaching near the hull of the vessel.



Figure 8 Clymene dolphin sighting aboard the OIV Vole au Vent on June 1st, 2020

A single PAM detection was made throughout the duration of the project window, by the M/V Berto Miller PSO team. The detection occurred during pre-installation operations (prior to pre-watch commencing) and was visually confirmed by a second PSO on the M/V Berto Miller, to be bottlenose dolphins (*Tursiops truncatus*). The animals were first sighted by

visual observers. Upon verifying PAMGuard, high frequency clicks could be seen starting at 120dB and moving to a peak amplitude of 160dB. The high frequency screen at this time was virtually full of clicks, ranging from 13.5kHz to 178kHz, with peak frequencies ranging from 28kHz to 64kHz. The bearing display indicated dolphins were located about 60 degrees off the bow and 100 degrees from the bow (congruent with PSO sighting off the port side moving from 11:00 clock face to the stern).

These high frequency clicks could be heard aurally, as well as seen on the spectrogram display. Clicks were fairly loud, producing a strong signal strength and an upper range of up to 250kHz, but with most below 218kHz. The low-mid frequency spectrogram displayed stacked whistles, indicating at least 5 individuals (PSO observed an estimated 10 individuals). Buzzes and burst pulses could also be heard aurally as well as seen on the spectrogram display. Buzzes had a high range of up to 125.6kHz. Burst pulses varied in sound, with some sounding like squeaks, and lasted less than half a second. While the M/V Berto Miller observer had lost sight of the pod, due to the movement of the pod in the opposite direction of the vessel's travel, the PAM operator could hear the dolphins until 06:30, and had been communicating with the Vole au Vent PSOs, which sighted a similarly sized group of dolphins at 06:06. Due to the continued nature of the PAM detection, it is suspected to be the same group of dolphins.

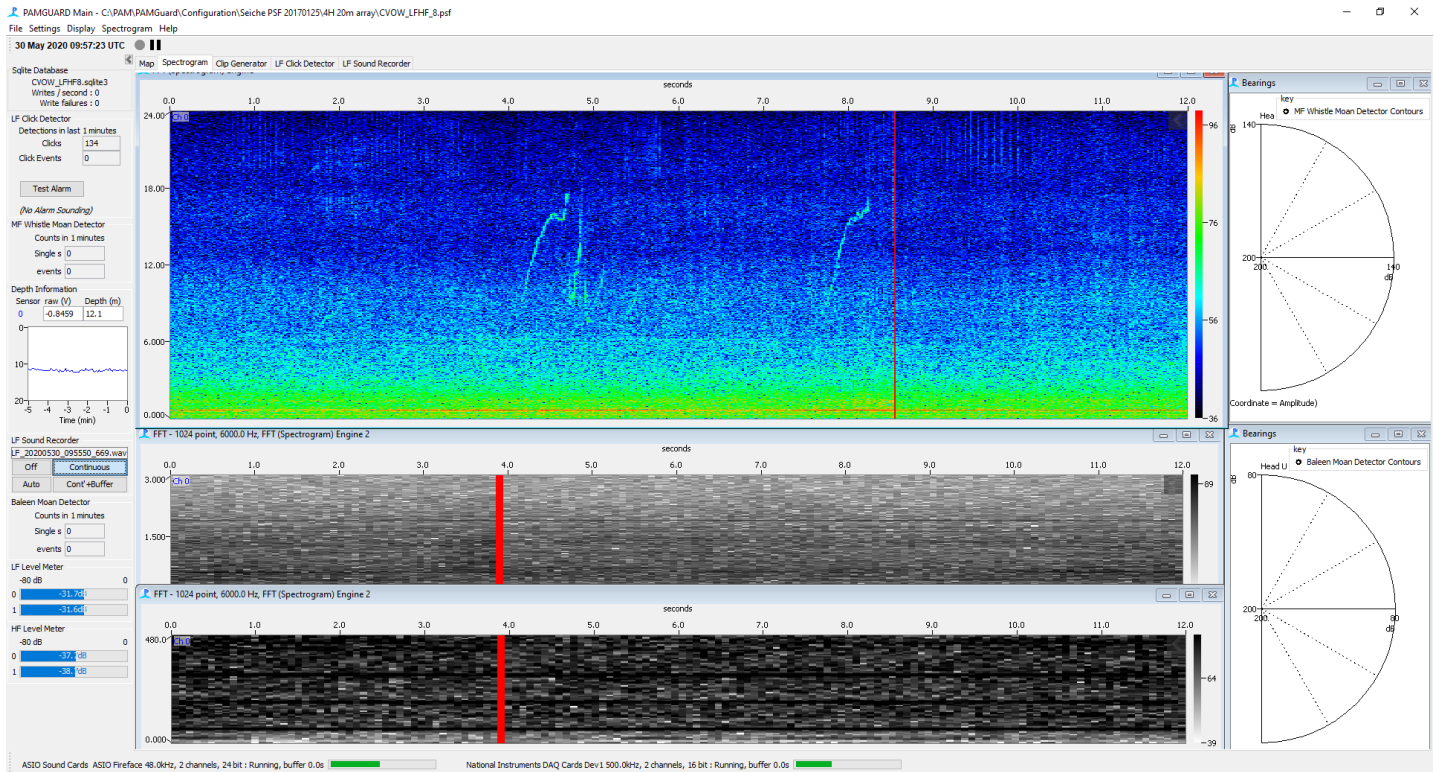


Figure 9 Passive Acoustic Monitoring Detection of Bottlenose Dolphin aboard the M/V Berto Miller

A total of three sightings occurred aboard the OVI Vole au Vent on the days on which pile driving activities occurred, all of which occurred prior to operations, and none during or after. As a result, there were some delays in operations but there were no requirements to shut down. All in all, a total of 2 hours and 32 minutes were spent in mitigation downtime as a result of delays to start-up operations due to sightings of protected species during pre-operation monitoring.

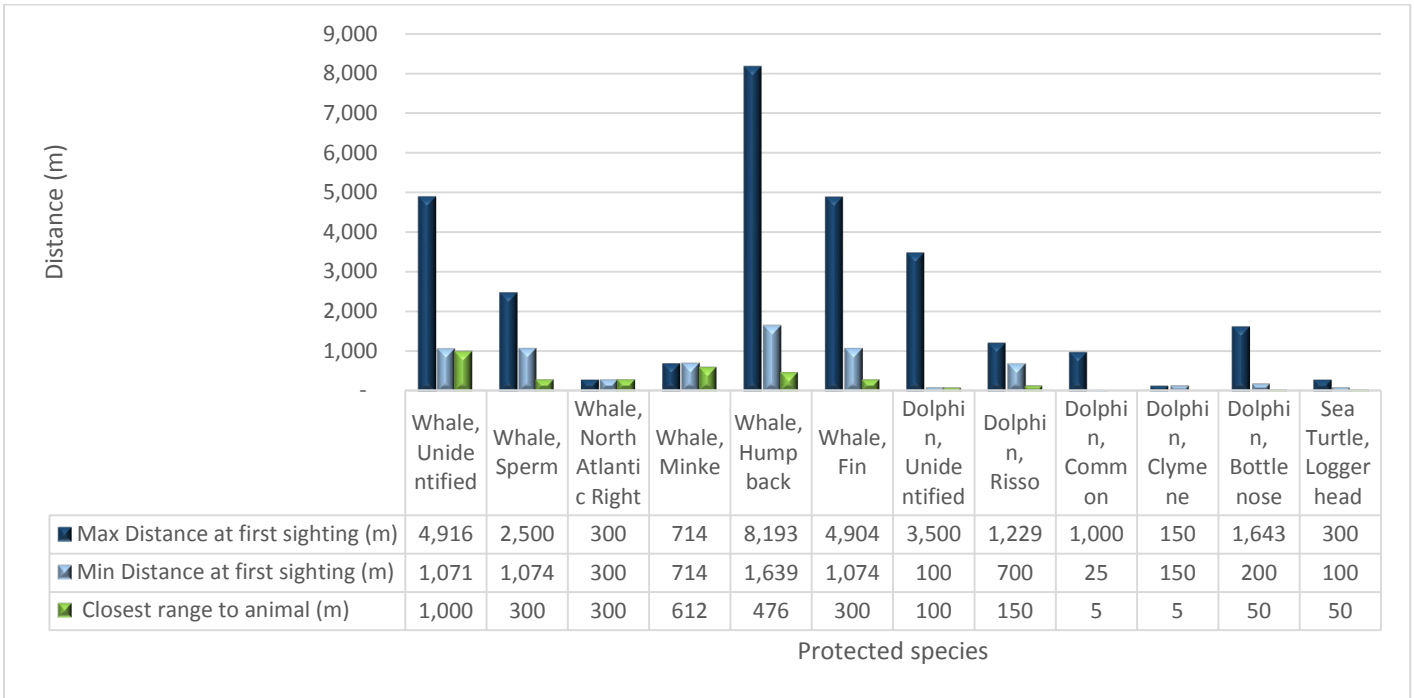


Figure 10 Protected Species Detections by Average Approach to the OIV Vole au Vent

Animal Closest Point of Approach (CPA) during monitoring in association with transit and pile driving operations varied by group (Figure 10); whale species, on average, were detected at greater distances than other species groups during operational and non-operational periods. Dolphins and sea turtles had the smallest average CPAs for both operational conditions.

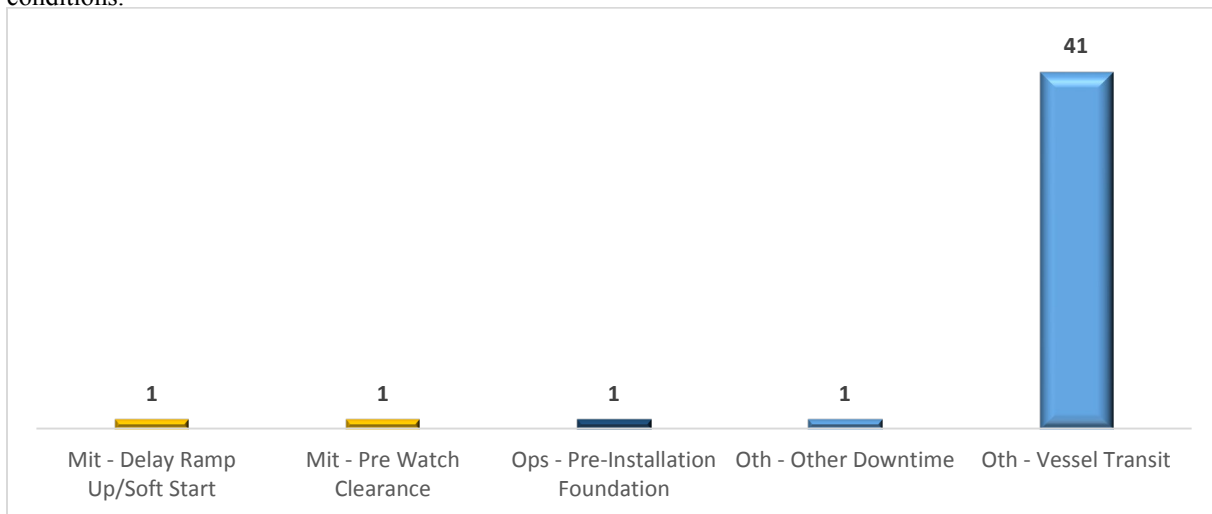


Figure 11 CVOW-1 - Vole Au Vent - Protected Species Detections by Vessel Activity

The majority (91%) of the sightings that were recorded in relation to the MV Vole au Vent on the CVOW project occurred during vessel transit. The remaining sighting occurred during pre-pile driving operations (7%) or project downtime(2%). The observation of a loggerhead sea turtle occurred during a ramp-up delay, pre-installation and other project downtime, while a group of bottlenose dolphins were sighted during pre-watch clearance. All other species described in Figure 10 were observed during transit.

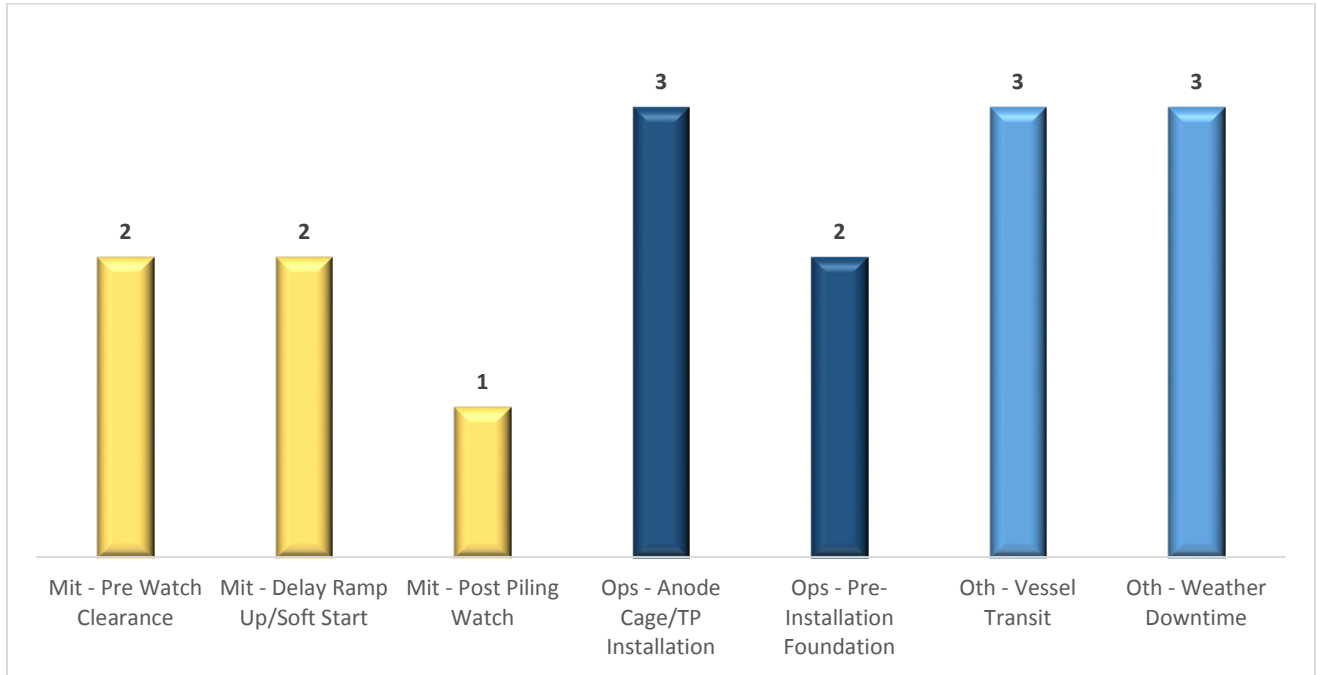


Figure 12 CVOW-1 - Berto Miller- Protected Species Detections by Vessel Activity

The sightings that were recorded in relation to the MV Berto Miller were distributed relatively evenly across operations, none of which were sighted during pile driving operations on the CVOW project. Common dolphins and a loggerhead sea turtle were sighted during pre-watch clearance (12.5%), unknown dolphins and a loggerhead sea turtle were sighted during a delayed ramp-up (12.5%), and a loggerhead sea turtle was sighted during post watch (6.25%). Bottlenose dolphins were sighted during anode installation (18.75%) and pre-installation operations (12.5%). Unidentified dolphins were recorded during transit (18.75%) and loggerhead sea turtles during weather downtime (18.75%).

Overall, no marine mammals or sea turtles were sighted during pile driving operations.

5. EXPOSURE ASSESSMENT

The IHA, received May 16th, 2020 assessed all potential project sources operating on the Lease. The distances to regulatory acoustic thresholds considered were calculated based on the CVOW field measurements to determine the distance at which potential marine mammal may be exposed to sound pressure levels (SPLs) at which permanent threshold shifts (Level A) or behavioral disturbance (Level B) could occur (see Waterproof report, Section 5). The area of water encompassing each of the threshold distances around the pile driving source is considered the exposure zone.

At the time of a detection, PSOs recorded the sources operating at the time of detection. Based on these distances and the detection records, animals reported by the PSOs as within each specified exposure zone while these sources are active would be considered taken by their respective harassment level under the Marine Mammal Protection Act (MMPA), i.e., Level A or level B. There were no marine mammals, sea turtles or Atlantic sturgeon detected during pile driving operations associated with CVOW, as summarized in Table 2. Additionally, there were no injured or dead protected species observed during pile driving operations associated with CVOW.

Table 2 Authorized marine mammal takes and maximum estimated takes by harassment for pile driving conducted under the Incidental Harassment Authorization.

Species - Name	IHA authorized (#)	IHA Actual (#)
Dolphin, Bottlenose	100	0
Dolphin, Common	39	0
Dolphin, Spotted	100	0
Dolphin, White-sided	40	0
Porpoise, Harbour	4	0
Seal, Gray	1	0
Seal, Harbor	1	0
Whale, Humpback	2	0
Whale, North Atlantic Right	-	0

Additionally, there were no injuries to sea turtles or sea turtle takes that occurred during the operations associated with the pile driving component of the CVOW project.

6. SUMMARY OF WEATHER & ENVIRONMENTAL CONDITIONS

Part of the data collection associated with PSO data includes various weather and environmental conditions including cloud cover, wind speed, wind direction, precipitation, sun glare and visibility during observations. These factors can affect the PSO team’s visibility in various manners, inhibiting exclusion and mitigation zone clearance and ultimately delaying operations. The following figures describe the distribution of weather variables on the days where visual monitoring occurred in anticipation of pile driving operations.

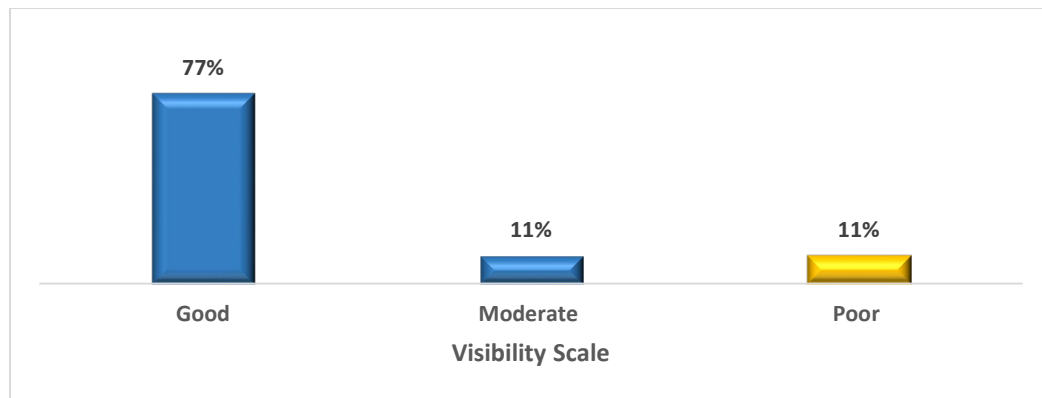


Figure 13 Visibility Distribution (Good = >5,000m, Moderate= 1,000 – 5,000m, Poor= <1,000m)

Overall, visibility was good during operations (Figure 13). The poor visibility contributed to a lack of pile driving operations on May 29th, 2020, a day on which pile driving activity was planned but ultimately did not occur due to the presence of heavy fog (Figure 14) through out the monitoring period associated with pre-clearance. This caused a day delay in finalizing installation of two piles. Otherwise, visibility was good and allowed for pile driving on two of three potential pile driving days. At no time did glare affect visibility, though it was present for a portion of time.

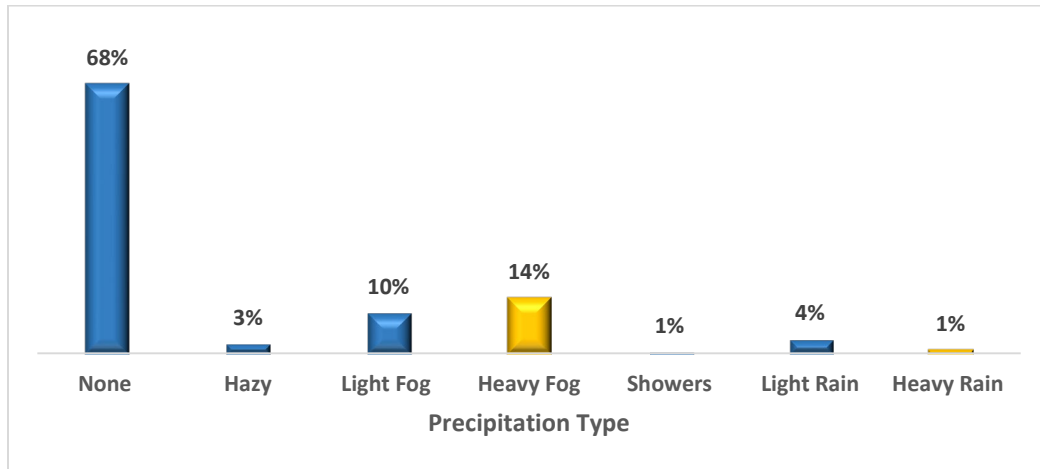


Figure 14 Precipitation Distribution

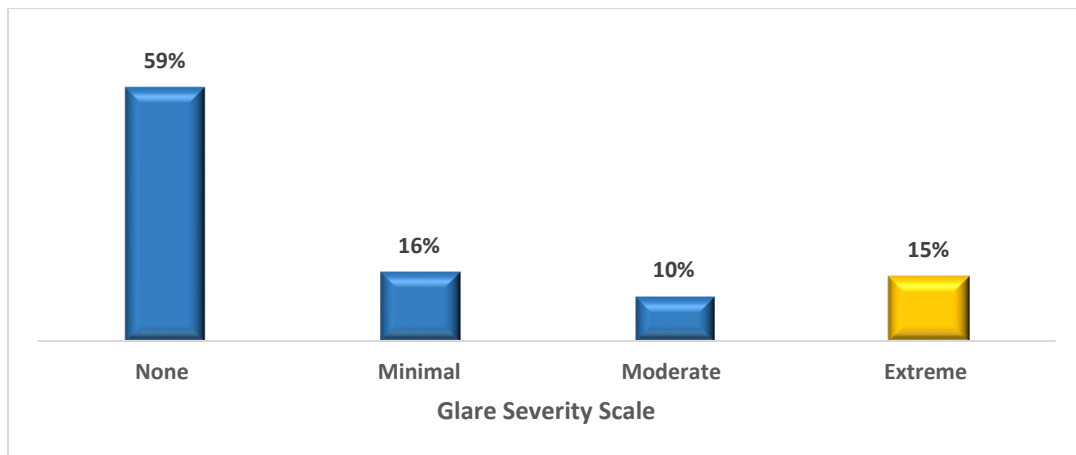


Figure 15 Glare Severity Distribution (None=0%, Minimal=<25% Moderate=25-50%, Extreme=>50%)

7. ASSESSMENT OF MONITORING METHODS

The daylight only operations allowed for a three person PSO team to effectively cover the exclusion and monitoring zones, with two PSO on watch, each covering 180° on either side of the vessel at any given time. The PSO team aboard the OIV Vole au Vent set up Big Eyes on either side of the vessel to increase monitoring distance. These allowed for the centralized team to view a much larger range from the raised platform than using regular binocular, particularly on the side of the vessel opposite the M/V Berto Miller team.

Additionally, the use of the support/monitoring vessel M/V Berto Miller in relation to operations aboard the OIV Vole au Vent was particularly useful in times of limited visibility due to fog in defining the exclusion zone when the horizon was not visible and the exclusion zone boundaries were hard to determine. As indicated in the report, communications between the M/V Berto Miller and the OIV Vole au Vent were effective, particularly in the case of detections of animals in relation to the OIV Vole au Vent.

Because PAM was deployed and used only in anticipation of, and during required acoustic mitigation periods, acoustic monitoring on the M/V Berto Miller was limited and therefore difficult to provide a detailed assessment. However, on May 30th a simultaneous dual detection (visual/acoustic) was recorded, providing the PSO team an opportunity to use complementary technologies to best record and document the dolphin detection.

Thermal imaging cameras were specifically deployed on starboard and port side the M/V Berto Miller for monitoring piling activity during period of reduced visibility. Since, piling activity only occurred during daylight hours, with no environmental factors affecting visibility conditions, the cameras remained on standby for the duration of the project.

Because the protected species monitoring requirements for this project did not allowed for nighttime operations, the NVD were mainly used for strike avoidance monitoring during transit of vessels. However, their range of visibility reaches only very close to the vessel even with the spotlight.

Appendix A. M/V Berto Miller Passive Acoustic Monitoring Set Up

The M/V Berto Miller was used as the support and monitoring vessel for three (3) of the A.I.S . Protected Species Observers during Jan de Nul pile driving operations for the Dominion Energy Wind Turbine project.

The Passive Acoustic Monitoring Computer system was set up in the wheelhouse. A hole was drilled in the exterior wall of the wheelhouse to allow the passage of the deck cable and connect the computer system to the PAM hardware. The cable was secured at various points between the wheelhouse and back deck of the M/V Berto Miller.

The AIS portable winch was located on the back deck from which the Passive Acoustic Monitoring equipment was deployed. The winch is specially designed to accommodate the bend radius of the equipment without issue.



- 1) PAM monitors have to be stacked and wall mounted in order to also fit the HD/Thermal cameras on the two available desks.



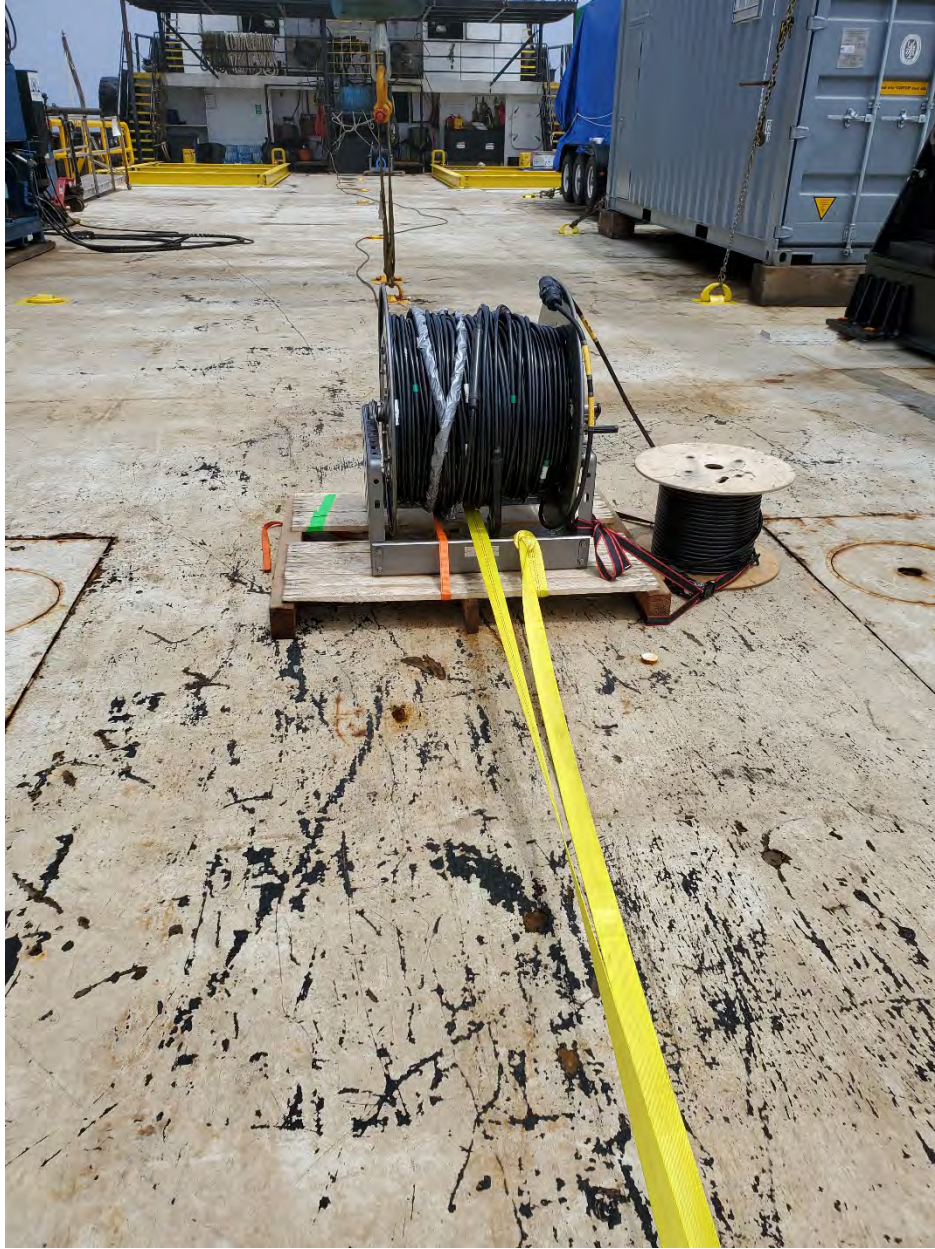
2) DPU goes under right desk. DPU sits atop case for camera gear because cords to monitors are not long enough to reach DPU without added height. Secure both DPU and platform (camera case) to vessel to prepare for weather. UPS battery backup secured next to DPU.



3) Spare deck and tow cables stored securely near forward back deck.



4) Deck cable runs from wheelhouse, across length of back deck, to tow cable.



Appendix B. OIV Vole au Vent - CVOW Final Activity Report Summary

REPORT SUMMARY

	Client	JDN	Report	FINAL	
	Project	CVOW-1	Date	20-May-20 to 04-Jun-20	

Vessel Name		Vole au Vent		Survey Type		Pile Driving	
Total Visual Monitoring Time	(hh:mm)	174:55		Total Number of Detections	(#)	45	
Total Acoustic Monitoring Time	(hh:mm)			Total Number of Shutdown(s)	(#)	0	
Total Mitigation Downtime	(hh:mm)	2:32		Total Number of Potential Non-Compliance	(#)	0	
<small>(Mitigation Downtime = Delay Ramp up + Shutdown)</small>							
Total Number of NARW detected	(#)			Total Number of DMA Verifications	(#)	17	
<small>(Dynamic Management Area)</small>							
Total Pile Driving Activity	(#)	2		Double Bubble Curtain Activation	(#)	3	
<small>(Active Attenuation Device)</small>							

Summary: Survey Activity - Monitoring - Detections

	Occurrence (#)	Duration (hh:mm)	Detection (#)	Animal (#)		Occurrence (#)	Duration (hh:mm)	Detection (#)	Animal (#)
Mit - Pre Watch Clearance	4	8:44	1	8	Ops - Anchoring/ DP/Jack-Up/Down	11	69:00		
Mit - Delay Ramp Up/Soft Start	3	2:32	1	1	Ops - Pre-Installation Foundation	2	5:09	1	1
Mit - Ramp-Up/Soft Start	2	0:21			Ops - Piling	2	2:36		
Mit - Shutdown					Ops - Anode Cage/TP Installation	5	56:55		
Mit - Post Piling Watch	3	1:13			Ops - Operational Downtime	1	0:09		
Mit - Change Course					Oth - Weather Downtime	2	33:42		
Oth - Vessel Transit	11	152:27	41	219	Oth - Other Downtime	2	13:49	1	1

Summary: Species Detections


Name	Visual (#)	Acoustic (#)	Thermal (#)	NVD (#)	Name	Visual (#)	Acoustic (#)	Thermal (#)	NVD (#)
Detection, Unidentified					Seal, Gray				
Dolphin, Bottlenose	2				Seal, Harbor				
Dolphin, Clymene	1				Seal, Harp				
Dolphin, Common	9				Seal, Unidentified				
Dolphin, Risso	2				Whale, Beaked species				
Dolphin, Spotted					Whale, Cuvier's Beaked				
Dolphin, Striped					Whale, False Killer				
Dolphin, Unidentified	6				Whale, Fin	6			
Dolphin, White-beaked					Whale, Humpback	4			
Dolphin, White-sided					Whale, Killer				
Kogia Species					Whale, Long-finned Pilot				
Porpoise, Harbour					Whale, Mnke	1			
Sea Turtle, Green					Whale, North Atlantic Right	1			
Sea Turtle, Kemp's Ridley					Whale, Pilot species				
Sea Turtle, Leatherback					Whale, Sei				
Sea Turtle, Loggerhead	3				Whale, Sperm	4			
Sea Turtle, Unidentified					Whale, Unidentified	6			

Summary: IHA - Marine Mammals Take Authorization

Name	EZ (m)	MZ (#)	Authorized (#)	Actual (#)	Name	EZ (m)	MZ (#)	Authorized (#)	Actual (#)
Detection, Unidentified	1,750	3,830/5,930			Seal, Unidentified	1,750	3,830/5,930		
Dolphin, Bottlenose	1,750	3,830/5,930	100		Whale, Beaked species	1,750	3,830/5,930		
Dolphin, Clymene	1,750	3,830/5,930			Whale, Cuvier's Beaked	1,750	3,830/5,930		
Dolphin, Common	1,750	3,830/5,930	39		Whale, False Killer	1,750	3,830/5,930		
Dolphin, Risso	1,750	3,830/5,930			Whale, Fin	1,750	3,830/5,930		
Dolphin, Spotted	1,750	3,830/5,930	100		Whale, Humpback	1,750	3,830/5,930	2	
Dolphin, Striped	1,750	3,830/5,930			Whale, Killer	1,750	3,830/5,930		
Dolphin, Unidentified	1,750	3,830/5,930			Whale, Long-finned Pilot	1,750	3,830/5,930		
Dolphin, White-beaked	1,750	3,830/5,930			Whale, Mnke	1,750	3,830/5,930		
Dolphin, White-sided	1,750	3,830/5,930	40		Whale, North Atlantic Right	Any distance	3,830/5,930		
Kogia Species	1,750	3,830/5,930			Whale, Pilot species	1,750	3,830/5,930		
Porpoise, Harbour	1,750	3,830/5,930	4		Whale, Sei	1,750	3,830/5,930		
Seal, Gray	1,750	3,830/5,930	1		Whale, Sperm	1,750	3,830/5,930		
Seal, Harbor	1,750	3,830/5,930	1		Whale, Unidentified	1,750	3,830/5,930		
Seal, Harp	1,750	3,830/5,930							

Appendix C. M/V Berto Miller - CVOW Final Activity Report Summary

REPORT SUMMARY

	Client	JDN	Report	FINAL	
	Project	CVOW-1	Date	21-May-20 to 30-May-20	

Vessel Name	Berto L Miller		Survey Type	Pile Driving	
Total Visual Monitoring Time (hh:mm)	86:12	Total Number of Detections (#)	16		
Total Acoustic Monitoring Time (hh:mm)	3:30	Total Number of Shutdown(s) (#)	0		
Total Mitigation Downtime (hh:mm)	2:32	Total Number of Potential Non-Compliance (#)	0		
(Mitigation Downtime = Delay Ramp up + Shutdown)					
Total Number of NARW detected (Dynamic Management Area) (#)		Total Number of DMA Verifications (#)	2		
Total Pile Driving Activity (Active Attenuation Device) (#)	2	Double Bubble Curtain Activation (#)	3		

Summary: Survey Activity - Monitoring - Detections

	Occurrence (#)	Duration (hh:mm)	Detection (#)	Animal (#)		Occurrence (#)	Duration (hh:mm)	Detection (#)	Animal (#)
Mit - Pre Watch Clearance	4	8:44	2	4	Ops - Anchoring/ DP/Jack-Up/Down	7	56:47		
Mit - Delay Ramp Up/Soft Start	3	2:32	2	2	Ops - Pre-Installation Foundation	2	5:09	2	20
Mit - Ramp-Up/Soft Start	2	0:21			Ops - Piling	2	2:36		
Mit - Shutdown					Ops - Anode Cage/TP Installation	4	37:17	3	5
Mit - Post Piling Watch	3	1:13	1	1	Ops - Operational Downtime	1	0:09		
Mit - Change Course					Oth - Weather Downtime	2	33:42	3	3
Oth - Vessel Transit	7	55:21	3	6	Oth - Other Downtime	2	13:49		

Summary: Species Detections

Name	Visual (#)	Acoustic (#)	Thermal (#)	NVD (#)	Name	Visual (#)	Acoustic (#)	Thermal (#)	NVD (#)
Detection, Unidentified					Seal, Gray				
Dolphin, Bottlenose	3	1			Seal, Harbor				
Dolphin, Clymene					Seal, Harp				
Dolphin, Common	1				Seal, Unidentified				
Dolphin, Risso					Whale, Beaked species				
Dolphin, Spotted					Whale, Cuvier's Beaked				
Dolphin, Striped					Whale, False Killer				
Dolphin, Unidentified	3				Whale, Fin				
Dolphin, White-beaked					Whale, Humpback	1			
Dolphin, White-sided					Whale, Killer				
Kogia Species					Whale, Long-finned Pilot				
Porpoise, Harbour					Whale, Minke				
Sea Turtle, Green					Whale, North Atlantic Right				
Sea Turtle, Kemp's Ridley					Whale, Pilot species				
Sea Turtle, Leatherback					Whale, Sei				
Sea Turtle, Loggerhead	7				Whale, Sperm				
Sea Turtle, Unidentified					Whale, Unidentified				

Summary: IHA - Marine Mammals Take Authorization

Name	EZ (m)	MZ (#)	Authorized (#)	Actual (#)	Name	EZ (m)	MZ (#)	Authorized (#)	Actual (#)
Detection, Unidentified	1,750	3,830/5,930			Seal, Unidentified	1,750	3,830/5,930		
Dolphin, Bottlenose	1,750	3,830/5,930	100		Whale, Beaked species	1,750	3,830/5,930		
Dolphin, Clymene	1,750	3,830/5,930			Whale, Cuvier's Beaked	1,750	3,830/5,930		
Dolphin, Common	1,750	3,830/5,930	39		Whale, False Killer	1,750	3,830/5,930		
Dolphin, Risso	1,750	3,830/5,930			Whale, Fin	1,750	3,830/5,930		
Dolphin, Spotted	1,750	3,830/5,930	100		Whale, Humpback	1,750	3,830/5,930	2	
Dolphin, Striped	1,750	3,830/5,930			Whale, Killer	1,750	3,830/5,930		
Dolphin, Unidentified	1,750	3,830/5,930			Whale, Long-finned Pilot	1,750	3,830/5,930		
Dolphin, White-beaked	1,750	3,830/5,930			Whale, Minke	1,750	3,830/5,930		
Dolphin, White-sided	1,750	3,830/5,930	40		Whale, North Atlantic Right	Any Distance	3,830/5,930		
Kogia Species	1,750	3,830/5,930			Whale, Pilot species	1,750	3,830/5,930		
Porpoise, Harbour	1,750	3,830/5,930	4		Whale, Sei	1,750	3,830/5,930		
Seal, Gray	1,750	3,830/5,930	1		Whale, Sperm	1,750	3,830/5,930		
Seal, Harbor	1,750	3,830/5,930	1		Whale, Unidentified	1,750	3,830/5,930		
Seal, Harp	1,750	3,830/5,930							

**Appendix D. OIV Vole au Vent - CVOW Protected Species Individual Detection
Summary**



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 1
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Activity - Time - Location

Date First Detected 5/21/2020	Date Last Detected 5/21/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 206
Time at first encounter (EDT) 1:32:00 PM	Time of closest to source (EDT) 1:45:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 1:45:00 PM
Latitude when first Sighted 42.3351	Longitude when first Sighted 65.7902	Latitude when last Sighted 42.3095	Longitude when last Sighted 65.8201	Distance at first Sighting (m) 8193	Closest Range to Animal (m) 4904

Detection Description

Animal Common Name Whale, Humpback	Certainty of Identification Best Guess	Description of Animal(s)	Moderately tall, bushy / plume shaped blows at slight angle (from perpendicular to water surface). Large bodied whale with dark/black dorsal color (visible during dive, but could not distinctly see dorsal fin due to distance). Arched back during dive.		
Best 1	Min 1	Max 2	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Medium Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 226		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Crossing perpendicular ahead of ship	
Detailed narrative of detection	Initially sighted off the starboard bow. 4 bushy/plume shaped blows of moderate/variable height observed from 13:32-13:36. Animal was traveling from starboard to port. 5 additional blows (same description) were observed from 13:41-13:45 off the port bow (relative bearing 11:00, using clockface, bow = 12:00). Animal appeared to dive and arched its back, and was not seen again. Was unable to see dorsal fin or additional identifying characteristics. Best guess for species identification is Humpback Whale, based on size, shape of blows, dark body color and dive pattern. Vessel was in transit to the installation site at the time of observation, and no strike avoidance mitigation was required. Distances estimated using binocular reticles.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 2
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Activity - Time - Location

Date First Detected 5/21/2020	Date Last Detected 5/21/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 221
Time at first encounter (EDT) 1:52:00 PM	Time of closest to source (EDT) 1:52:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 1:57:00 PM
Latitude when first Sighted 42.2959	Longitude when first Sighted 65.8362	Latitude when last Sighted 42.2863	Longitude when last Sighted 65.8474	Distance at first Sighting (m) 3065	Closest Range to Animal (m) 3065

Detection Description

Animal Common Name Whale, Unidentified	Certainty of Identification Sure	Description of Animal(s)	Bushy blows of variable height, at slight angle (from perpendicular to water surface). No other identifying characteristics were visible due to distance.		
Best 1	Min 1	Max 2	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Slow	Behavior state Rest/Slow Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 227		Relative Bearing to animal (clock face) Bow = 12:00 9:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	3 bushy blows of variable height (characteristic of a large baleen whale species) were observed off the port side of Vole Au Vent. The animal was not seen again. No additional identifying characteristics were observed. Vessel was in transit to the installation site, and no strike avoidance mitigation was required. Distances estimated using binocular reticles.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 3
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Activity - Time - Location

Date First Detected 5/21/2020	Date Last Detected 5/21/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 220
Time at first encounter (EDT) 2:36:00 PM	Time of closest to source (EDT) 2:36:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 2:36:00 PM
Latitude when first Sighted 42.2125	Longitude when first Sighted 65.9371	Latitude when last Sighted 42.21245	Longitude when last Sighted 65.9371	Distance at first Sighting (m) 4916	Closest Range to Animal (m) 4916

Detection Description

Animal Common Name Whale, Unidentified	Certainty of Identification Sure	Description of Animal(s)	3-4 bushy blows sighted approximately 2-3 meters high. No other identifying characteristics noticed due to the distance		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Slow	Behavior state Rest/Slow Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 227		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Other	
Detailed narrative of detection	3-4 bushy blows approximately 2-3 meters in height, observed at 11:00 position relative to the vessel's bow. No additional information could be documented due to distance of animal and length of sighting.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 4
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Activity - Time - Location

Date First Detected 5/21/2020	Date Last Detected 5/21/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 216
Time at first encounter (EDT) 3:21:00 PM	Time of closest to source (EDT) 3:21:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 3:21:00 PM
Latitude when first Sighted 42.1250	Longitude when first Sighted 66.0416	Latitude when last Sighted 42.1250	Longitude when last Sighted 66.0416	Distance at first Sighting (m) 2458	Closest Range to Animal (m) 2458

Detection Description

Animal Common Name Whale, Unidentified	Certainty of Identification Sure	Description of Animal(s)	Bushy blows sighted of approximately 2-3 meters high. Black fluke seen during dive.		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Slow	Behavior state Rest/Slow Travel	Individual Behavior Fluke up	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 230		Relative Bearing to animal (clock face) Bow = 12:00 10:00		Direction of Travel (relative to vessel) Crossing perpendicular ahead of ship	
Detailed narrative of detection	bushy blows and a dark fluke visible during dive seen at 10:00 position relative to the vessel's bow. Whale was slowly swimming at a direction perpendicular to the vessel's path. The captain was notified of the location of the whale, but no mitigation was necessary because of the whale's distance from the vessel.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 5
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 65
Time at first encounter (EDT) 4:42:00 AM	Time of closest to source (EDT) 4:46:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 4:52:00 AM
Latitude when first Sighted 40.7407	Longitude when first Sighted 67.0331	Latitude when last Sighted 40.7187	Longitude when last Sighted 68.07370	Distance at first Sighting (m) 1639	Closest Range to Animal (m) 492

Detection Description

Animal Common Name Whale, Humpback	Certainty of Identification Sure	Description of Animal(s)	Bushy blows sighted approximately 2 meters in height. Dark dorsal fin with hump present, and fluke visible during dive		
Best 2	Min 2	Max 3	Adults 2	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Slow	Behavior state Rest/Slow Travel	Individual Behavior Fluke up	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 234		Relative Bearing to animal (clock face) Bow = 12:00 12:00		Direction of Travel (relative to vessel) Crossing perpendicular ahead of ship	
Detailed narrative of detection	2-3 adult whales sighted 12:00 relative to vessel at approximately 1639 meters (distance estimated using reticled binoculars), and travelling in the direction of the vessel's port side. The captain was notified of the location of the whale in case speed or course needed to be altered. No strike avoidance mitigation was necessary as the whale's closest approach was 492 meters (distance estimated using reticled binoculars) off the vessel's port side. Note: there was just enough natural light to see without using NVD for this sighting.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 6
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 75.90
Time at first encounter (EDT) 5:36:00 AM	Time of closest to source (EDT) 5:36:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 5:45:00 AM
Latitude when first Sighted 40.6686	Longitude when first Sighted 68.1669	Latitude when last Sighted 40.6486	Longitude when last Sighted 68.2041	Distance at first Sighting (m) 1639	Closest Range to Animal (m) 1639

Detection Description

Animal Common Name Whale, Humpback	Certainty of Identification Sure	Description of Animal(s)	Bushy blows sighted approximately 2 meters in height. Dark dorsal fin with hump present, and fluke visible during dives.		
Best 6	Min 6	Max 8	Adults 6	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Mill	Individual Behavior Other	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 235		Relative Bearing to animal (clock face) Bow = 12:00 9:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	6-8 adult whales sighted at 09:00 relative to the vessel, at approximately 1639 meters (distance estimated using reticled binoculars). Initially, several bushy blows of approximately 2 meters in height were observed. Skim feeding behavior was observed in multiple individuals, but no fish could be seen. No direction of travel for the group was observed, so best guess is they were feeding. Additionally, several white and black mottled flukes were seen during dives. Whales last seen at 07:00 bearing relative to the vessel, at 2458 meters (distance estimated using reticled binoculars).				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 7
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 75.20
Time at first encounter (EDT) 6:04:00 AM	Time of closest to source (EDT) 7:06:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 7:13:00 AM
Latitude when first Sighted 40.6157	Longitude when first Sighted 68.2691	Latitude when last Sighted 40.5093	Longitude when last Sighted 68.4901	Distance at first Sighting (m) 4284	Closest Range to Animal (m) 476

Detection Description

Animal Common Name Whale, Humpback	Certainty of Identification Sure	Description of Animal(s)	Large bodied dark colored whales. Long white pectoral flippers. Flukes with jagged trailing edge and white markings on underside. Small dorsal fins, aft of mid-body. Bushy and plume shaped blows of variable heights.		
Best 15	Min 12	Max 18	Adults 15	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Stationary	Behavior state Surface-Active Mill	Individual Behavior Other	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 236		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	4-6 bushy blows of variable height initially observed off the port bow, at a distance of 4+ km. An additional group of similar size/shape blows were observed in the same general direction (10:00-11:00 using clock face) at a greater distance (approx. 8km). Blows, occasional large splashes, and large bodied whales continued to be regularly observed in the same area as the vessel continued transiting toward the animals. The amount of activity observed indicated a large pod of whales. As the distance to the animals decreased, more identifying characteristics were observed, and the animals were positively identified as Humpback Whales. The pod was highly active at the surface, appeared to be feeding, and remained in the same general area. The closest approach of any of the whales occurred at 07:06, approximately 476m (PSO 2, T. Horwell - from bridge level, 45 mil below horizon using binoculars with reticles) off the port side of Vessel (approximate bearing 09:30 using clock face). The sighting event concluded at 07:13, with whales last observed approximately 1071m off the port stern of the vessel. Vessel was in transit to the installation site at the time of observation, and no strike avoidance mitigation was required, as the whales did not approach within 100m. Distances were estimated using binocular reticles, from the bridge.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 8
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 76.60
Time at first encounter (EDT) 7:47:00 AM	Time of closest to source (EDT) 7:47:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 7:47:00 AM
Latitude when first Sighted 40.4571	Longitude when first Sighted 68.5898	Latitude when last Sighted 40.4571	Longitude when last Sighted 68.5898	Distance at first Sighting (m) 1071	Closest Range to Animal (m) 1071

Detection Description

Animal Common Name Whale, Unidentified	Certainty of Identification Sure	Description of Animal(s)	Large bodied dark colored whale (observed a single time, partially breaching and creating a large splash). No observed blows or identifying characteristics		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Slow	Behavior state Unknown	Individual Behavior Breach	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 236		Relative Bearing to animal (clock face) Bow = 12:00 10:30		Direction of Travel (relative to vessel) Away from the ship	
Detailed narrative of detection	Large bodied whale observed partially breaching a single time, off port bow of the Vole Au Vent. Created a large splash and was not seen again. No blows or additional identifying characteristics were observed. Vessel was in transit to the installation site at the time of observation, and no strike avoidance mitigation was required. Distances estimated using binocular reticles.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) -	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 9
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 93.90000000000006
Time at first encounter (EDT) 9:38:00 AM	Time of closest to source (EDT) 9:43:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 9:43:00 AM
Latitude when first Sighted 40.2860	Longitude when first Sighted 68.9223	Latitude when last Sighted 40.2730	Longitude when last Sighted 68.9466	Distance at first Sighting (m) 1100	Closest Range to Animal (m) 850

Detection Description

Animal Common Name Whale, Sperm	Certainty of Identification Sure	Description of Animal(s) brownish gray body, blow at 45 degrees, hump-like dorsal, fluke shovel like with a deep notch and a smooth edge			
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Surface-Active Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 232		Relative Bearing to animal (clock face) Bow = 12:00 10:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	a blow was seen at 10:00 relative to the vessel approximately 1100 meters (distance estimated using reticled binoculars). There were several observed blows over a five minute period as the whale swam at the surface parallel to the vessel, each blow distinctly at a 45 degree angle. There were 7 total blows observed as it swam closer to the vessel. The whale was last seen at 9:43, where it dove and its fluke was spade-like and smooth.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 10
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 169
Time at first encounter (EDT) 10:29:00 AM	Time of closest to source (EDT) 10:33:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 10:39:00 AM
Latitude when first Sighted 40.2132	Longitude when first Sighted 68.0727	Latitude when last Sighted 40.2090	Longitude when last Sighted 69.1008	Distance at first Sighting (m) 2500	Closest Range to Animal (m) 530

Detection Description

Animal Common Name Whale, Sperm	Certainty of Identification Sure	Description of Animal(s) brownish gray body, blow at 45 degrees, hump-like dorsal, fluke shovel like			
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Stationary	Behavior state Mill	Individual Behavior Other	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 236		Relative Bearing to animal (clock face) Bow = 12:00 10:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	animal was initially sighted by its distinctive 45 degree blow at 10:00 relative to the vessel approximately 2500 (distance estimated using reticled binoculars) meters away. The animal remained logging at the surface, releasing a blow every once in a while, and continued its behavior when it was last sighted at 10:39				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 11
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 143
Time at first encounter (EDT) 10:42:00 AM	Time of closest to source (EDT) 10:43:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 10:47:00 AM
Latitude when first Sighted 40.2076	Longitude when first Sighted 69.1181	Latitude when last Sighted 40.2062	Longitude when last Sighted 69.1285	Distance at first Sighting (m) 700	Closest Range to Animal (m) 450

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Sure	Description of Animal(s)	saddle back pattern on dorsal of dark grey, hour glass pattern on the side with tan and white, falcate dorsal fin		
Best 20	Min 15	Max 30	Adults 20	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Vigorous	Behavior state Fast Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 261		Relative Bearing to animal (clock face) Bow = 12:00 2:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	splashes were seen a roughly 700 meters (distance estimated using reticled binoculars) at 2:00 relative to the vessel. Dolphins were swimming rapidly at the surface, swimming in the opposite direction as the vessel. The closest the dolphins approached was roughly 450m, at bearing 3:00 relative to the vessel. Dolphins continued to travel at the surface until they were last seen at 10:47				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 12
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 102
Time at first encounter (EDT) 11:12:00 AM	Time of closest to source (EDT) 11:16:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 11:22:00 AM
Latitude when first Sighted 40.1689	Longitude when first Sighted 69.2015	Latitude when last Sighted 40.1552	Longitude when last Sighted 69.2239	Distance at first Sighting (m) 1500	Closest Range to Animal (m) 1000

Detection Description

Animal Common Name Whale, Unidentified	Certainty of Identification Best Guess	Description of Animal(s)	dark grey bodies, falcate-like dorsal fin, tall blows		
Best 2	Min 2	Max 3	Adults 2	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Medium Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 229		Relative Bearing to animal (clock face) Bow = 12:00 10:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	the first blow was sighted at 10:00 relative to the vessel, at approximately 1500 meters (distance estimated using reticled binoculars). Two tall blows were seen before the whales swam beneath the surface and reappeared at 9:30 relative to the vessel, at approximately 1000 meters. Two blows occurred simultaneously at this time and a clear view of their dorsal fin was seen. Unfortunately a clear view of their diving pattern was not observed so the species can only be narrowed down to either the Fin or the Sei whale. The whales swam and surfaced a few more time before they were last seen at 11:22				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 13
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 101
Time at first encounter (EDT) 12:27:00 PM	Time of closest to source (EDT) 12:39:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 12:44:00 PM
Latitude when first Sighted 40.0474	Longitude when first Sighted 69.4056	Latitude when last Sighted 40.0199	Longitude when last Sighted 69.4563	Distance at first Sighting (m) 4284	Closest Range to Animal (m) 1428

Detection Description

Animal Common Name Whale, Unidentified	Certainty of Identification Sure	Description of Animal(s)	Large bodied whale with sleek dark gray dorsal surface. Tall elliptical shaped blows at slight angle (from perpendicular to water surface) toward aft of animal. Falcate dorsal fin aft of mid-body. (Characteristics indicate that the animal is surely Fin or		
Best 3	Min 2	Max 4	Adults 3	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Medium Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 231		Relative Bearing to animal (clock face) Bow = 12:00 2:00		Direction of Travel (relative to vessel) Parallel to ship in the same direction	
Detailed narrative of detection	Multiple tall blows (1 - 2 animals) were observed off the starboard bow (initial sighting distance estimated from Above Bridge Level Outside, PSO 2 - T. Horwell, 5 mil with binoculars) from 12:27-12:35. At 12:39, 2 - 3 individuals were sighted off the starboard side from the bridge (bearing 02:00 using clock face). This was the closest approach to the vessel. The animals all appeared to be travelling the same direction as the vessel but at a slower pace. Multiple blows and possible dives were observed in the same general locations until the end of the sighting event at 12:44. The observed whales can be described as either Fin or Sei Whales, but unable to determine the exact species due to distance/ lack of visible identifying characteristics. Vessel was in transit to the installation site at the time of observation, and no strike avoidance mitigation was required. Distances estimated using binocular reticles.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 14
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 126
Time at first encounter (EDT) 2:31:00 PM	Time of closest to source (EDT) 2:35:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 2:47:00 PM
Latitude when first Sighted 39.8556	Longitude when first Sighted 69.7499	Latitude when last Sighted 39.8363	Longitude when last Sighted 69.7950	Distance at first Sighting (m) 200	Closest Range to Animal (m) 50

Detection Description

Animal Common Name Dolphin, Bottlenose	Certainty of Identification Sure	Description of Animal(s) Robust body. Gray dorsal and white ventral color. Tall, wide, falcate dorsal fin			
Best 15	Min 12	Max 18	Adults 15	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Moderate	Behavior state Surface-Active Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 242		Relative Bearing to animal (clock face) Bow = 12:00 12:00		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	First sighted animals via splashing approximately 200m off the bow (visual estimate). The pod of dolphins swam toward the vessel and to the starboard side, where they milled, staying alongside the vessel between 50-100m. At 14:45 they began travelling away from the vessel (parallel in the opposite direction). Sighting event concluded at 14:47, when the dolphins were approximately 428m off the starboard stern. Vessel was in transit to the installation site at the time of observation, and no strike avoidance mitigation was required. Distances were estimated both visually and with binocular reticles.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 15
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 71.30
Time at first encounter (EDT) 3:07:00 PM	Time of closest to source (EDT) 3:15:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 3:17:00 PM
Latitude when first Sighted 39.8079	Longitude when first Sighted 69.8564	Latitude when last Sighted 39.7136	Longitude when last Sighted 69.8791	Distance at first Sighting (m) 1639	Closest Range to Animal (m) 819

Detection Description

Animal Common Name Dolphin, Unidentified	Certainty of Identification Sure	Description of Animal(s) Dark bodies, dark falcate dorsal fins			
Best 6	Min 5	Max 8	Adults 6	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Slow	Behavior state Mill	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 238.4000		Relative Bearing to animal (clock face) Bow = 12:00 1:30		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Splashes initially sighted at 1639 meters (distance estimated using reticled binoculars) at 01:30 relative to the vessel. Direction of travel was variable the entirety of sighting until finally seeing a final splash at approximately 5000 meters (distance estimated using reticled binoculars) to the 04:00 position relative to the vessel. Other than dark falcate dorsal fins, no other identifiable characteristics were observed. No mitigation necessary				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 16
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 100
Time at first encounter (EDT) 3:28:00 PM	Time of closest to source (EDT) 3:32:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 3:32:00 PM
Latitude when first Sighted 39.7954	Longitude when first Sighted 69.8809	Latitude when last Sighted 39.7746	Longitude when last Sighted 69.9248	Distance at first Sighting (m) 1229	Closest Range to Animal (m) 615

Detection Description

Animal Common Name Dolphin, Risso	Certainty of Identification Sure	Description of Animal(s)	White and gray mottling present around mid-body and increasing towards the head. No beak visible, tall falcate dorsal fin. Dark coloration near posterior of dorsal fin.		
Best 4	Min 3	Max 5	Adults 0	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Slow	Behavior state Mill	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 239		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Splashes initially sighted at 1229 meters (distance estimated using reticled binoculars) at 11:00 position relative to the vessel. Dolphins surfaced numerous times throughout sighting event. Direction of travel was variable the entirety of sighting until finally seeing a final splash at approximately 3000 meters (distance estimated using reticled binoculars), bearing 07:00 relative to the vessel. Varying degrees of white and gray mottling anterior of the dorsal fin were observed on the dolphins, with a tall falcate dorsal fin and no presence of a beak suggest a pod of risso's dolphins were observed. No mitigation necessary.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 17
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Activity - Time - Location

Date First Detected 5/23/2020	Date Last Detected 5/23/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) None	Water Depth (m) 2600
Time at first encounter (EDT) 8:07:00 AM	Time of closest to source (EDT) 8:10:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 8:40:00 AM
Latitude when first Sighted 38.3581	Longitude when first Sighted 72.7157	Latitude when last Sighted 38.2726	Longitude when last Sighted 72.8751	Distance at first Sighting (m) 100	Closest Range to Animal (m) 10

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Sure	Description of Animal(s)	Dark gray/black dorsal color, forming a V - shape below the dorsal fin. Hourglass pattern on sides of body (tan fwd., gray aft). Approx. 2-2.5 m length. Falcate dorsal fin near mid body		
Best 8	Min 6	Max 10	Adults 8	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Dorsal	Pace Moderate	Behavior state Bow Riding	Individual Behavior Bow Riding	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 230		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	Dolphins initially observed approximately 100m (visual estimate) off port bow, porpoising towards the Vole Au Vent. Observed behavior included: bow riding, porpoising, and milling. The dolphins swam with the vessel, at times circling and milling on both sides, staying within approximately 100m. The group was last observed off the starboard side, milling. Vessel was in transit to the installation site at the time of observation, and no strike avoidance mitigation was required. The dolphins displayed voluntary approach / vessel attractant behavior.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) -	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 18
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Activity - Time - Location

Date First Detected 5/23/2020	Date Last Detected 5/23/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 600
Time at first encounter (EDT) 4:36:00 PM	Time of closest to source (EDT) 4:48:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 5:43:00 PM
Latitude when first Sighted 37.5025	Longitude when first Sighted 74.2701	Latitude when last Sighted 38.4552	Longitude when last Sighted 74.3643	Distance at first Sighting (m) 25	Closest Range to Animal (m) 5

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Sure	Description of Animal(s) Dark falcate dorsal fin. Hourglass shape pattern beneath dorsal fin.			
Best 8	Min 7	Max 8	Adults 7	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Moderate	Behavior state Bow Riding	Individual Behavior Bow Riding	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 222		Relative Bearing to animal (clock face) Bow = 12:00 10:00		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	Splashes initially sighted at 25 meters (distance estimated using naked eye) at 10:00 position relative to the vessel. Dolphins moved in direction towards vessel and began bow riding. Dolphins observed closest approach to vessel was 5 meters at 16:48. Dolphins last seen at 17:43. No mitigation necessary because bow riding is considered vessel attractant behavior.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 19
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Activity - Time - Location

Date First Detected 5/25/2020	Date Last Detected 5/25/2020	Observation Type Daylight Visual	Survey Activity Ops - Pre-Installation Foundation	Energy Source(s) -	Water Depth (m) 27
Time at first encounter (EDT) 7:22:00 AM	Time of closest to source (EDT) 7:26:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 7:29:00 AM
Latitude when first Sighted 36.8862	Longitude when first Sighted 75.4925	Latitude when last Sighted 36.8862	Longitude when last Sighted 75.4925	Distance at first Sighting (m) 100	Closest Range to Animal (m) 50

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Sure	Description of Animal(s)	Reddish brown/orange head and carapace. Many barnacles visible on carapace. Approx. 1m shell length		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Slow	Behavior state Mill	Individual Behavior Other	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 243		Relative Bearing to animal (clock face) Bow = 12:00 1:30		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	PSO was on bridge but no dedicated watch was being conducted at the time of observation (Vessel was jacked up, preparing for pile installation). Crew member alerted PSO to a turtle off the starboard bow. The turtle was observed swimming towards the vessel, then milling around the area until last observed diving out of view. The turtle came to the surface several times, and was observed with its head completely out of the water. PSO had a birds eye view of the turtle due to the height of observation platform, and had a clear view of it's head and carapace. No mitigation action was required (vessel stationary, and no in water activities underway).				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 20
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Activity - Time - Location

Date First Detected 5/29/2020	Date Last Detected 5/29/2020	Observation Type Daylight Visual	Survey Activity Oth - Other Downtime	Energy Source(s) -	Water Depth (m) 25
Time at first encounter (EDT) 3:42:00 PM	Time of closest to source (EDT) 3:51:00 PM	Time animal entered EZ (EDT) 3:42:00 PM	Time animal left EZ (EDT) 3:51:00 PM	Time animal in the EZ (hh:mm) 00:09	Time at end of encounter (EDT) 3:51:00 PM
Latitude when first Sighted 36.8957	Longitude when first Sighted 75.4906	Latitude when last Sighted 36.8957	Longitude when last Sighted 75.4906	Distance at first Sighting (m) 300	Closest Range to Animal (m) 100

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Sure	Description of Animal(s)	Yellow/orange head and carapace. Fouling organisms on carapace. Approx. 1m shell length		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Slow	Behavior state Mill	Individual Behavior Other	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 141		Relative Bearing to animal (clock face) Bow = 12:00 4:00		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	Initially sighted directly off starboard side of Vole Au Vent near mid-ship. The turtle milled in the area, remaining near the surface throughout the sighting, occasionally lifting its head out of the water. It slowly moved towards the vessel, and was last observed at bearing 04:00 (using clockface) diving out of view. One PSO was on watch at the time (primarily on watch to monitor visibility conditions), as piling operations had already been called off for the day. No mitigation was necessary.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 21
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Activity - Time - Location

Date First Detected 5/30/2020	Date Last Detected 5/30/2020	Observation Type Daylight Visual	Survey Activity Mit - Pre Watch Clearance	Energy Source(s) -	Water Depth (m) 25
Time at first encounter (EDT) 6:06:00 AM	Time of closest to source (EDT) 6:32:00 AM	Time animal entered EZ (EDT) 6:06:00 AM	Time animal left EZ (EDT) 6:53:00 AM	Time animal in the EZ (hh:mm) 00:47	Time at end of encounter (EDT) 6:53:00 AM
Latitude when first Sighted 36.8957	Longitude when first Sighted 75.4906	Latitude when last Sighted 36.8957	Longitude when last Sighted 75.4906	Distance at first Sighting (m) 1643	Closest Range to Animal (m) 200

Detection Description

Animal Common Name Dolphin, Bottlenose	Certainty of Identification Most Likely	Description of Animal(s)	Robust Body. Tall, gray and falcate dorsal fin.		
Best 8	Min 6	Max 10	Adults 8	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Slow	Behavior state Surface-Active Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 141		Relative Bearing to animal (clock face) Bow = 12:00 9:30		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	<p>at 06:06, a pod dolphins initially observed approximately 1643 meters away (distance estimated using binoculars with reticles) at 09:30 position relative to the vessel. The pod was travelling slowly towards the Vole au Vent's stern, and was observed continually throughout the detection. The closest approach was observed at 06:32 off the port side of vessel, at a distance of approximately 200 meters (estimated with naked eye). Dolphins last seen off the vessel's starboard stern, at 06:53. This sighting is suspected to be the same group of dolphins as was earlier detected by the Berto Miller (At ~05:45, Berto Miller lead PSO informed Vole Au Vent of visual and acoustic detection of dolphins off the Vole Au Vent's starboard side). Lead PSO notified Vole Au Vent's vessel personnel of the sighting within the EZ. It did not impact operations, as the hammer was not ready for piling until 10:31.</p>				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 22
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Activity - Time - Location

Date First Detected 5/30/2020	Date Last Detected 5/30/2020	Observation Type Daylight Visual	Survey Activity Mit - Delay Ramp Up/Soft Start	Energy Source(s) Piling Hammer	Water Depth (m) 25
Time at first encounter (EDT) 10:28:00 AM	Time of closest to source (EDT) 10:35:00 AM	Time animal entered EZ (EDT) 10:28:00 AM	Time animal left EZ (EDT) 10:44:00 AM	Time animal in the EZ (hh:mm) 00:16	Time at end of encounter (EDT) 10:44:00 AM
Latitude when first Sighted 36.8957	Longitude when first Sighted 75.4906	Latitude when last Sighted 36.8957	Longitude when last Sighted 75.4906	Distance at first Sighting (m) 125	Closest Range to Animal (m) 100

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Sure	Description of Animal(s)	Reddish brown carapace and head. Broad neck and head. Approx. 1m shell length. Many barnacles present on carapace. Individual scutes visible in photos, but difficult to get exact count		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Slow	Behavior state Rest/Slow Travel	Individual Behavior None	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 141		Relative Bearing to animal (clock face) Bow = 12:00 1:00:00 AM		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	Initially sighted off starboard bow (approximately 50m from vessel, 125m from hammer/ sound source). The turtle slowly approached the vessel and milled in the area for approximately 10 minutes, diving under the water surface several times. It then slowly traveled starboard to port, and was last observed approximately 10m directly off the bow, or approximately 125m from the sound source, when it dove out of view at 10:44 (bearing 12:00 using clockface). PSO immediately notified vessel crew of the sighting and requested that soft start be delayed until the EZ could be re - cleared for at least 30 minutes. Vessel was not ready to initiate soft start at the time of the sighting, so the mitigation delay was from the time the hammer was ready for piling (10:31) until the EZ was cleared at 11:14. Soft start did not occur immediately upon EZ clearance due to an operational delay that began almost exactly at the time of EZ clearance.				

Mitigation – Compliance - Other

What action requested? Mit - Delay Ramp Up/Soft Start	Was action implemented? Yes	Time Mitigation Started (EDT) 10:31:00 AM	Time Mitigation Ended (EDT) 11:14:00 AM	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 23
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Activity - Time - Location

Date First Detected 6/1/2020	Date Last Detected 6/1/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 49.10000000000001
Time at first encounter (EDT) 5:55:00 AM	Time of closest to source (EDT) 5:59:00 AM	Time animal entered EZ (EDT) 5:59:00 AM	Time animal left EZ (EDT) 6:00:00 AM	Time animal in the EZ (hh:mm) 00:01	Time at end of encounter (EDT) 6:08:00 AM
Latitude when first Sighted 37.1692	Longitude when first Sighted 74.934	Latitude when last Sighted 37.0176	Longitude when last Sighted 74.8982	Distance at first Sighting (m) 1000	Closest Range to Animal (m) 10

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Most Likely	Description of Animal(s) Dark falcate dorsal fin. Dark/black dorsal body color. Long slender beak. Est. length 2-2.5m.			
Best 6	Min 4	Max 8	Adults 6	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Vigorous	Behavior state Surface-Active Mill	Individual Behavior Feeding on observed fish	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 51		Relative Bearing to animal (clock face) Bow = 12:00 11:30		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Several splashes seen at the 11:30 clockface position relative to the vessel at a distance of 1000m at 0555 hrs. Because no direction of travel was evident for the dolphins and fish could be observed among the splashes, PSO requested the vessel alter course to the starboard side as a precaution. The vessel operator complied immediately. However, the dolphins exhibited vessel attractant behavior at 05:59 and swam towards the vessel's bow, with a CPA of 10 meters. Dolphins could be observed astern of the vessel until 06:08, continuing to feed on fish at the surface.				

Mitigation – Compliance - Other

What action requested? Mit - Change Course	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance Yes	Injured/Death Marine mammal No	Dual Detection (PAM) -	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 24
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Activity - Time - Location

Date First Detected 6/1/2020	Date Last Detected 6/1/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 51
Time at first encounter (EDT) 6:22:00 AM	Time of closest to source (EDT) 6:22:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 6:22:00 AM
Latitude when first Sighted 37.1943	Longitude when first Sighted 74.8623	Latitude when last Sighted 37.1943	Longitude when last Sighted 74.8623	Distance at first Sighting (m) 100	Closest Range to Animal (m) 100

Detection Description

Animal Common Name Dolphin, Unidentified	Certainty of Identification Sure	Description of Animal(s) Dark colored, falcate dorsal fin. Est. length 2-3m.			
Best 3	Min 2	Max 4	Adults 3	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Moderate	Behavior state Unknown	Individual Behavior None	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 52		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	Brief observation off port bow. Dolphins were seen surfacing 1-2 times each over a period of ~ 5 sec, and were not seen again. Dorsal fins and partial dorsal bodies were visible. Unable to determine species due to duration of sighting. No mitigation required. Vessel was in transit to port at the time of observation.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 25
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Activity - Time - Location

Date First Detected 6/1/2020	Date Last Detected 6/1/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) None	Water Depth (m) 270
Time at first encounter (EDT) 10:12:00 AM	Time of closest to source (EDT) 10:12:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 10:12:00 AM
Latitude when first Sighted 37.4603	Longitude when first Sighted 74.4001	Latitude when last Sighted 37.4603	Longitude when last Sighted 74.4001	Distance at first Sighting (m) 100	Closest Range to Animal (m) 100

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Sure	Description of Animal(s) Dark falcate dorsal fin. Hourglass shape pattern beneath dorsal fin, tan fwd.			
Best 2	Min 2	Max 3	Adults 2	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Vigorous	Behavior state Fast Travel	Individual Behavior Breach	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 57		Relative Bearing to animal (clock face) Bow = 12:00 1:00		Direction of Travel (relative to vessel) Crossing perpendicular ahead of ship	
Detailed narrative of detection	Brief observation off starboard bow resulted in no pictures taken. First dolphin full body breached while second seen surfacing simultaneously and then both reappearing directly off the bow roughly 4 seconds later, and then not seen again.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 26
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Activity - Time - Location

Date First Detected 6/1/2020	Date Last Detected 6/1/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 2467
Time at first encounter (EDT) 7:58:00 PM	Time of closest to source (EDT) 8:07:00 PM	Time animal entered EZ (EDT) 8:00:00 PM	Time animal left EZ (EDT) 8:07:00 PM	Time animal in the EZ (hh:mm) 00:07	Time at end of encounter (EDT) 8:07:00 PM
Latitude when first Sighted 38.2971	Longitude when first Sighted 72.8069	Latitude when last Sighted 38.308	Longitude when last Sighted 72.7872	Distance at first Sighting (m) 150	Closest Range to Animal (m) 5

Detection Description

Animal Common Name Dolphin, Clymene	Certainty of Identification Most Likely	Description of Animal(s)	Tri-color: darker gray back/dorsal, light gray sides, bright white belly. Beak dark upper, white lower, and looks shorter relative to spinner dolphin. Est length 1.5-2m. Tall, falcate dorsal fin		
Best 5	Min 4	Max 6	Adults 3	Juveniles 2	Calves 0
Sex Class Indeterminate	Sighting Cue Dorsal	Pace Vigorous	Behavior state Bow Riding	Individual Behavior Bow Riding	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 57		Relative Bearing to animal (clock face) Bow = 12:00 12:00		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	Initially observed directly off the bow (sighted from above bridge), Porpoising rapidly towards the vessel. PSO went down to the bow after losing sight of the dolphins, and observed the group bow riding and breaching 5-15m from the hull of the vessel. The group was last observed turning to port and swimming out of sight. Vole Au Vent was in transit to Halifax at the time of observation. Dolphins displayed a voluntary approach / vessel attractant behavior, and no mitigation was necessary. A short video was recorded of bow riding/ breaching.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 27
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 2478
Time at first encounter (EDT) 6:43:00 AM	Time of closest to source (EDT) 6:44:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 6:48:00 AM
Latitude when first Sighted 39.3663	Longitude when first Sighted 70.7149	Latitude when last Sighted 39.3736	Longitude when last Sighted 70.6998	Distance at first Sighting (m) 1226	Closest Range to Animal (m) 981

Detection Description

Animal Common Name Dolphin, Unidentified	Certainty of Identification Sure	Description of Animal(s) Falcate dorsal fin. Est length 2-3m (difficult to tell at distance)			
Best 15	Min 12	Max 18	Adults 15	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Vigorous	Behavior state Fast Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 56		Relative Bearing to animal (clock face) Bow = 12:00 8:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	Distant splashing observed off the port bow. Determined to be a pod of dolphins upon viewing through binoculars. The pod was Porpoising rapidly in the opposite direction of the vessel, and did not approach. Last observed porpoising in the same general direction, at a distance of 2142m, bearing 08:00 (using clockface). Unable to determine species due to distance. Vole Au Vent was in transit to Halifax at the time of observation.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 28
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 2478
Time at first encounter (EDT) 7:20:00 AM	Time of closest to source (EDT) 7:22:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 7:25:00 AM
Latitude when first Sighted 39.4276	Longitude when first Sighted 70.5879	Latitude when last Sighted 39.4373	Longitude when last Sighted 70.5686	Distance at first Sighting (m) 981	Closest Range to Animal (m) 817

Detection Description

Animal Common Name Dolphin, Unidentified	Certainty of Identification Sure	Description of Animal(s) Falcate dorsal fin. Est length 2-3m (difficult to tell at distance)			
Best 8	Min 6	Max 10	Adults 8	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Stationary	Behavior state Mill	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 55		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Distant splashing observed off the port bow. Determined to be a small pod of dolphins upon viewing through binoculars. The pod was milling in the same location, and possibly feeding, as they appeared to be lunging rapidly back and forth. At 07:24, the pod began Porpoising further away from the vessel, and PSO lost sight of them one minute later. Unable to determine species due to distance. Vole Au Vent was in transit to Halifax at the time of observation.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) -	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 29
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 2200
Time at first encounter (EDT) 8:53:00 AM	Time of closest to source (EDT) 8:56:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 9:04:00 AM
Latitude when first Sighted 39.5998	Longitude when first Sighted 70.2745	Latitude when last Sighted 39.6176	Longitude when last Sighted 70.2311	Distance at first Sighting (m) 1200	Closest Range to Animal (m) 300

Detection Description

Animal Common Name Whale, Sperm	Certainty of Identification Sure	Description of Animal(s) brownish gray body, blow at 45 degrees, hump-like dorsal, fluke shovel like			
Best 3	Min 2	Max 3	Adults 3	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Slow	Behavior state Rest/Slow Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 54		Relative Bearing to animal (clock face) Bow = 12:00 11:30		Direction of Travel (relative to vessel) Crossing perpendicular ahead of ship	
Detailed narrative of detection	a blow was seen at 11:30 relative to the vessel approximately 1200 meters (distance estimated using reticled binoculars). There were several blows over an eleven minute period as the whales swam slowly at the surface perpendicularly ahead of the vessel, each blow distinctly at a 45 degree angle. There were three individuals, two individuals reaching the surface, and then a third. The whales were last seen at 9:04, as the Vole Au Vent continued on its transit and the whales could no longer be seen				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 30
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 1967
Time at first encounter (EDT) 10:16:00 AM	Time of closest to source (EDT) 10:17:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 10:43:00 AM
Latitude when first Sighted 39.7477	Longitude when first Sighted 70.0025	Latitude when last Sighted 39.7975	Longitude when last Sighted 69.9026	Distance at first Sighting (m) 350	Closest Range to Animal (m) 5

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Sure	Description of Animal(s)	saddle back pattern on dorsal of dark grey, hour glass pattern on the side with tan and white, falcate dorsal fin		
Best 2	Min 2	Max 2	Adults 2	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Vigorous	Behavior state Bow Riding	Individual Behavior Bow Riding	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 58		Relative Bearing to animal (clock face) Bow = 12:00 12:00		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	dolphins initially observed approximately 350 off of the bow (visually estimated), porpoising rapidly towards the vessel. PSO went down to the bow after losing sight of the dolphins. 2 dolphins were bow riding and breaching 5-20m from the hull of the vessel. Dolphins displayed a voluntary approach/vessel attractant behavior, no mitigation action was necessary.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 31
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 859
Time at first encounter (EDT) 11:17:00 AM	Time of closest to source (EDT) 11:17:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 11:19:00 AM
Latitude when first Sighted 39.8491	Longitude when first Sighted 69.8005	Latitude when last Sighted 39.8565	Longitude when last Sighted 69.7856	Distance at first Sighting (m) 3500	Closest Range to Animal (m) 3500

Detection Description

Animal Common Name Dolphin, Unidentified	Certainty of Identification Sure	Description of Animal(s) Falcate dorsal fin. Est length 2-3m (difficult to tell at distance)			
Best 8	Min 5	Max 10	Adults 8	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Vigorous	Behavior state Fast Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 59		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Crossing perpendicular ahead of ship	
Detailed narrative of detection	Distant splashing observed off the port bow. Determined to be a pod of dolphins upon viewing through binoculars. The pod was porpoising rapidly, perpendicular across the bow of the vessel, and did not approach. Last observed porpoising in the same direction at 3500m at 2 o'clock bearing. Unable to determine species due to distance.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 32
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) None	Water Depth (m) 324
Time at first encounter (EDT) 11:50:00 AM	Time of closest to source (EDT) 11:51:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 11:56:00 AM
Latitude when first Sighted 39.912	Longitude when first Sighted 69.6771	Latitude when last Sighted 39.9134	Longitude when last Sighted 69.6714	Distance at first Sighting (m) 300	Closest Range to Animal (m) 5

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Sure	Description of Animal(s)	saddle back pattern on dorsal of dark grey, hour glass pattern on the side with tan and white, falcate dorsal fin		
Best 4	Min 4	Max 4	Adults 4	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Vigorous	Behavior state Bow Riding	Individual Behavior Bow Riding	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 60		Relative Bearing to animal (clock face) Bow = 12:00 12:00		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	dolphins initially observed approximately 300 off of the bow (visually estimated), porpoising rapidly towards the vessel. 4 dolphins were bow riding and breaching 5-20m from the hull of the vessel. Dolphins displayed a voluntary approach/vessel attractant behavior, no mitigation action was necessary. Last seen turning to port and swimming out of sight.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 33
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 150
Time at first encounter (EDT) 12:28:00 PM	Time of closest to source (EDT) 12:31:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 12:32:00 PM
Latitude when first Sighted 39.9482	Longitude when first Sighted 69.5664	Latitude when last Sighted 39.9572	Longitude when last Sighted 69.5517	Distance at first Sighting (m) 700	Closest Range to Animal (m) 150

Detection Description

Animal Common Name Dolphin, Risso	Certainty of Identification Sure	Description of Animal(s)	Dark to light gray color, with extensive scarring on body. Melon shaped head, no beak. Very tall and falcate dorsal fin. Est length 3-4m		
Best 4	Min 4	Max 4	Adults 4	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Dorsal	Pace Moderate	Behavior state Medium Travel	Individual Behavior None	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 55		Relative Bearing to animal (clock face) Bow = 12:00 8:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	Initially observed off port bow, by dorsal fins and a light blue hue under the water surface. The animals continued at a steady pace, travelling in the opposite direction as vessel, and slightly more to port/away from the Vole Au Vent. CPA was at bearing 09:00 (using clockface). Last observed approximately 300m at bearing 08:00 (using clockface). Vole Au Vent was in transit to Halifax at the time of observation. No strike avoidance mitigation was required.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 34
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 101
Time at first encounter (EDT) 1:40:00 PM	Time of closest to source (EDT) 1:43:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 1:45:00 PM
Latitude when first Sighted 40.0763	Longitude when first Sighted 69.3391	Latitude when last Sighted 40.0801	Longitude when last Sighted 69.3275	Distance at first Sighting (m) 1226	Closest Range to Animal (m) 701

Detection Description

Animal Common Name Whale, Fin	Certainty of Identification Sure	Description of Animal(s)	Sleek dorsal surface with falcate dorsal fin aft of mid-body. Dark steel gray color. Very tall blow, almost perpendicular to water surface 10-20m est. height. Arched back and rolled forward during dive		
Best 3	Min 2	Max 4	Adults 3	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Medium Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 75		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	5 blows initially observed directly off the bow (sighted from above bridge). Dorsal fins were visible and 2 whales were observed arching backs, possibly diving. The whales continued parallel opposite and moving to Vole Au Vents port. Closest approach was observed off port bow, bearing 11:00 (using clockface). A series of multiple blows were observed 13:33-13:34, followed by apparent dives. Whales arched their backs and rolled forward in wheel like motion, dove, and were not seen again. Vessel was in transit to Halifax at the time of observation. No strike avoidance mitigation was required.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 35
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 102
Time at first encounter (EDT) 1:57:00 PM	Time of closest to source (EDT) 2:13:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 2:31:00 PM
Latitude when first Sighted 40.1003	Longitude when first Sighted 69.2856	Latitude when last Sighted 40.1667	Longitude when last Sighted 69.1578	Distance at first Sighting (m) 4904	Closest Range to Animal (m) 300

Detection Description

Animal Common Name Whale, Fin	Certainty of Identification Sure	Description of Animal(s)	Sleek dorsal surface with falcate dorsal fin aft of mid-body. Dark steel gray color. Very tall blow, almost perpendicular to water surface 10-20m est. height. Arched back and rolled forward during dive		
Best 4	Min 3	Max 5	Adults 4	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Medium Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 56		Relative Bearing to animal (clock face) Bow = 12:00 2:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	11-13 blows observed from 13:57 - 14:08: range 2452-4904m (5-10 miles using binoculars, PSO T. Horwell from above bridge). All blows were similar size and shape (tall, elliptical and almost perpendicular to water surface, 10+m in height) and easily visible with naked eye. At 14:08, 2 dives were observed through binoculars (dorsal fins visible, arched backs and rolled forward). 12 - 15 additional, periodic blows of the same description were observed at approximately the same distance (estimated 2 - 3 km from vessel using binocular reticles), at a bearing of 1:30-3:00 (using clockface), indicating the whales were moving the opposite direction of the ship. 2 additional fin whales (same id characteristics were described) were observed (blows and dives) by PSO C. Brooks between 14:11-14:14, approximately 300m (visual estimate) off the starboard side at bearing 04:00 (using clockface). These whales also appeared to be travelling at a moderate pace, in the opposite direction as the vessel. No strike avoidance measures were required, as the whales did not approach within 100m of the vessel. Vole Au Vent was in transit to Halifax at the time of observation.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 36
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 92
Time at first encounter (EDT) 2:22:00 PM	Time of closest to source (EDT) 2:26:00 PM	Time animal entered EZ (EDT) 2:26:00 PM	Time animal left EZ (EDT) 2:28:00 PM	Time animal in the EZ (hh:mm) 00:02	Time at end of encounter (EDT) 2:28:00 PM
Latitude when first Sighted 40.1429	Longitude when first Sighted 69.2037	Latitude when last Sighted 40.1429	Longitude when last Sighted 69.2037	Distance at first Sighting (m) 537	Closest Range to Animal (m) 10

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Sure	Description of Animal(s)	Saddle back pattern on dorsal of dark grey body, Long slender beak, tall dark falcate dorsal fin.		
Best 25	Min 20	Max 30	Adults 25	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Splash	Pace Vigorous	Behavior state Fast Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 59		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	Several small splashes observed at 11:00 clockface relative to the vessel at 14:22, at an approximated distance of 537 meters (distance estimated using reticled binoculars) travelling quickly towards the vessel. They were observed bow riding at 14:24, and had a CPA of 10 meters at 14:26. No mitigation was implemented because the dolphins were exhibiting vessel attractant behavior. Last confirmed sighting of dolphins was 14:28 while they were bow riding. They were not observed leaving the bow of the vessel because of the on-going whale sightings and the right whale observed at 14:32. Therefore, no end of sighting Lat/Long were recorded.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 37
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 90
Time at first encounter (EDT) 2:32:00 PM	Time of closest to source (EDT) 2:32:00 PM	Time animal entered EZ (EDT) 2:32:00 PM	Time animal left EZ (EDT) 2:32:00 PM	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 2:32:00 PM
Latitude when first Sighted 40.1667	Longitude when first Sighted 69.1578	Latitude when last Sighted 40.1667	Longitude when last Sighted 69.1578	Distance at first Sighting (m) 300	Closest Range to Animal (m) 300

Detection Description

Animal Common Name Whale, North Atlantic Right	Certainty of Identification Sure	Description of Animal(s)	Dark black body. Rough, tan colored patches on lower lip. Very likely callosities. Smooth black fluke present during dive. Fluke with smooth concave margin		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Slow	Behavior state Unknown	Individual Behavior Fluke up	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 61		Relative Bearing to animal (clock face) Bow = 12:00 1:30		Direction of Travel (relative to vessel) Away from the ship	
Detailed narrative of detection	Large black body observed, possible callosities on lower lip, and a smooth concave fluke seen at 14:32 approximately 300 meters (distance estimated using naked eye). Whale observed at the 1:30 clockface position relative to the vessel, travelling away from the vessel to the starboard side. Because of the whale's location and direction of travel (whale was not in vessel's path), it was not deemed a risk for vessel strike or at risk of approaching closer than 100 meters of the vessel as it passed. Therefore, no mitigation was requested. Only 1 surfacing was observed, sighting only lasted a few seconds. PSO CB was able to take 1 photo of the whale as it dove, and was able to confirm it was a right whale after reviewing the photo of the fluke zoomed-in. At that point, the whale would have been outside of the 500 meter exclusion zone for NARW, so no further action was requested. PSO was stationed at end of starboard wing at time of observation. Vole Au Vent was in transit to Halifax at the time of observation.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 38
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 89
Time at first encounter (EDT) 3:06:00 PM	Time of closest to source (EDT) 3:08:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 3:08:00 PM
Latitude when first Sighted 40.2058	Longitude when first Sighted 69.0497	Latitude when last Sighted 40.2058	Longitude when last Sighted 69.0497	Distance at first Sighting (m) 1074	Closest Range to Animal (m) 1074

Detection Description

Animal Common Name Whale, Sperm	Certainty of Identification Sure	Description of Animal(s)	Brownish-gray body, blows at an angle. Hump-like dorsal. Logging behavior at surface		
Best 2	Min 2	Max 2	Adults 2	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Slow	Behavior state Rest/Slow Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 50		Relative Bearing to animal (clock face) Bow = 12:00 12:00		Direction of Travel (relative to vessel) Away from the ship	
Detailed narrative of detection	2 large blows at 45-degree angle observed at 15:06, at the 12:00 clockface position, approximately 1074 meters away (distance estimated using reticled binoculars). Both whales exhibited logging behavior at the surface for approximately 2 minutes before diving. Both whales heads were pointed towards our starboard side, so PSO CB requested the vessel alter course to port to avoid a vessel strike. The vessel operator complied immediately. A dive footprint was seen at 15:08 at approximately 1000 meters (distance estimated using naked eye) at the 1:00 position. No changes in behavior were observed.				

Mitigation – Compliance - Other

What action requested? Mit - Change Course	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance Yes	Injured/Death Marine mammal No	Dual Detection (PAM) -	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 39
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 95
Time at first encounter (EDT) 3:15:00 PM	Time of closest to source (EDT) 3:30:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 3:33:00 PM
Latitude when first Sighted 40.2197	Longitude when first Sighted 69.0310	Latitude when last Sighted 40.2448	Longitude when last Sighted 69.9818	Distance at first Sighting (m) 4296	Closest Range to Animal (m) 1432

Detection Description

Animal Common Name Whale, Fin	Certainty of Identification Sure	Description of Animal(s)	Dark gray body, rounded during dive, falcate dorsal fin. Tall blows.		
Best 3	Min 3	Max 3	Adults 3	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Medium Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 57		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	3 large slender blows observed at 15:15, at the 11:00 clockface position relative to the vessel, at a distance of 4296 meters (distance estimated using reticled binoculars). Whales continued surfacing 4-5 times between dives. Closest approach was 1432 meters at 15:30, at bearing 09:00 (clockface position). Last sighting was at 1:33 at bearing 08:00 (clockface position). Due to the high number of sightings, it felt necessary to prioritize watch immediately in front of the vessel, so observations of these whales discontinued at 15:33. No changes in behavior were observed.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 40
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 92
Time at first encounter (EDT) 4:29:00 PM	Time of closest to source (EDT) 4:32:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 4:37:00 PM
Latitude when first Sighted 40.3492	Longitude when first Sighted 68.7924	Latitude when last Sighted 40.3622	Longitude when last Sighted 68.7690	Distance at first Sighting (m) 1074	Closest Range to Animal (m) 537

Detection Description

Animal Common Name Whale, Fin	Certainty of Identification Sure	Description of Animal(s)	Dark gray body, rounded during dive, falcate dorsal fin. Tall blows.		
Best 2	Min 2	Max 3	Adults 2	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Medium Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 56		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	2-3 large slender blows observed at 16:29, at the 11:00 clockface position relative to the vessel, at a distance of 1074 meters (distance estimated using reticled binoculars). Whales were swimming parallel to the ship and in the opposite direction, towards the stern, surfacing approximately 5 times per dive. Closest approach was 537m at 16:32, bearing 09:00 (clockface position). Last time of sighting was at 16:37, whales could be seen 612 meters away at the 08:00 clockface position, continuing to swim in the opposite direction of the vessel. No changes in behavior were observed.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 41
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 88
Time at first encounter (EDT) 4:49:00 PM	Time of closest to source (EDT) 4:49:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 4:49:00 PM
Latitude when first Sighted 40.3845	Longitude when first Sighted 68.7303	Latitude when last Sighted 40.3845	Longitude when last Sighted 68.7303	Distance at first Sighting (m) 4296	Closest Range to Animal (m) 4296

Detection Description

Animal Common Name Whale, Fin	Certainty of Identification Most Likely	Description of Animal(s)	Tall elliptical shaped blow		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Medium Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 57		Relative Bearing to animal (clock face) Bow = 12:00 1:00		Direction of Travel (relative to vessel) Other	
Detailed narrative of detection	1 tall elliptical blow seen at 16:49 at 1:00 clockface position, approximately 4296 meters away from the vessel (distance estimated using reticled binoculars). Only 1 blow was observed. Due to the distance, no direction of travel was determined. No mitigation necessary.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 42
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 92
Time at first encounter (EDT) 5:12:00 PM	Time of closest to source (EDT) 5:22:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 5:25:00 PM
Latitude when first Sighted 40.4265	Longitude when first Sighted 68.6561	Latitude when last Sighted 40.4491	Longitude when last Sighted 68.6137	Distance at first Sighting (m) 4296	Closest Range to Animal (m) 400

Detection Description

Animal Common Name Whale, Fin	Certainty of Identification Sure	Description of Animal(s) Tall elliptical shaped blow, tall dark falcate dorsal fin, with large rounded back visible during dive			
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Moderate	Behavior state Medium Travel	Individual Behavior Blow	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 59		Relative Bearing to animal (clock face) Bow = 12:00 1:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	1 Tall elliptical blow seen at 17:12 at the 1:00 clockface position, relative to the vessel, at approximately 4296 meters away from the vessel (distance estimated using reticled binoculars). Whale observed surfacing 3-5 times between dives, travelling in a direction parallel to, but in the opposite direction of the vessel. Closest approach of the whale was estimated to be 400 meters at the 03:00 position relative to the vessel, at 17:22. No behavioral changes were observed, and no mitigations were required.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 43
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 91
Time at first encounter (EDT) 6:21:00 PM	Time of closest to source (EDT) 6:24:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 6:26:00 PM
Latitude when first Sighted 40.5439	Longitude when first Sighted 68.4252	Latitude when last Sighted 40.5508	Longitude when last Sighted 68.4095	Distance at first Sighting (m) 973	Closest Range to Animal (m) 250

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Sure	Description of Animal(s)	Dark gray dorsal color, forming a V - shape below the dorsal fin. Hourglass pattern on sides of body (tan fwd., gray aft). Estimated body length ~2m. Dark, falcate dorsal fin		
Best 14	Min 12	Max 16	Adults 14	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Dorsal	Pace Moderate	Behavior state Medium Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 64		Relative Bearing to animal (clock face) Bow = 12:00 3:00		Direction of Travel (relative to vessel) Crossing perpendicular ahead of ship	
Detailed narrative of detection	A pod of dolphins was observed porpoising off the bow, from port to starboard. The pod then turned and travelled opposite and parallel to the Vole Au Vents heading. At 18:24, they were approximately 250m directly off the starboard side, bearing 03:00 (using clockface). The pod was last observed approximately 500m away, travelling in the same direction, at bearing 04:00 (using clockface). No strike avoidance measures were required. Vole Au Vent was in transit to Halifax at the time of observation.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 44
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 80.30
Time at first encounter (EDT) 7:09:00 PM	Time of closest to source (EDT) 7:11:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 7:13:00 PM
Latitude when first Sighted 40.6237	Longitude when first Sighted 68.2460	Latitude when last Sighted 40.6268	Longitude when last Sighted 68.2398	Distance at first Sighting (m) 714	Closest Range to Animal (m) 612

Detection Description

Animal Common Name Whale, Minke	Certainty of Identification Sure	Description of Animal(s)	Dark gray or black dorsal color. Sharp and falcate dorsal fin near aft of mid body. Small size relative to fin or sei whale: estimated length 6-8m. Blow was barely visible, just mist close to surface		
Best 2	Min 2	Max 3	Adults 2	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Dorsal	Pace Moderate	Behavior state Medium Travel	Individual Behavior None	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 64		Relative Bearing to animal (clock face) Bow = 12:00 3:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	Initially observed off the starboard bow, travelling opposite/ parallel to the Vole Au Vent's heading, and angled slightly to starboard. The whale's behavior was cryptic, only surfacing slightly for very brief periods of time (no photograph as result), displaying dorsal fins and part of their dorsal bodies. Two very faint blows were observed, producing a small puff of mist close to the water surface. Two individuals surfaced simultaneously during the sighting. Closest approach was directly off the starboard side, bearing 03:00 (using clockface). Binoculars (with reticles) were used to identify species, and estimate distances for this sighting. No strike avoidance measures were required. Vole Au Vent was in transit to Halifax at the time of observation.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) -	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Vole au Vent	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 45
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Activity - Time - Location

Date First Detected 6/2/2020	Date Last Detected 6/2/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 84.30
Time at first encounter (EDT) 7:36:00 PM	Time of closest to source (EDT) 7:36:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 7:39:00 PM
Latitude when first Sighted 40.6659	Longitude when first Sighted 68.1572	Latitude when last Sighted 40.6698	Longitude when last Sighted 68.1492	Distance at first Sighting (m) 1635	Closest Range to Animal (m) 1226

Detection Description

Animal Common Name Dolphin, Unidentified	Certainty of Identification Sure	Description of Animal(s) Dark dorsal color. Falcate dorsal fin near mid body. Estimated body length 2-3m.			
Best 5	Min 4	Max 6	Adults 4	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Moderate	Behavior state Medium Travel	Individual Behavior None	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 62		Relative Bearing to animal (clock face) Bow = 12:00 8:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	Initially observed off the port bow. The small group travelled further to port, then parallel and opposite the direction of the vessel. The dolphins did not porpoise or approach the vessel within 1226m (25 mils, PSO T. Horwell), and were difficult to identify to the species level as a result. Closest approach was directly off the port side, and the group was last observed at bearing 08:00 (using clockface). No strike avoidance measures were required. Vole Au Vent was in transit to Halifax at the time of observation.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No

**Appendix E. MV Berto Miller - CVOW Project Protected Species Individual
Detection Summary**



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 1
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Activity - Time - Location

Date First Detected 5/21/2020	Date Last Detected 5/21/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 24.38
Time at first encounter (EDT) 8:15:00 PM	Time of closest to source (EDT) 8:15:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 8:15:00 PM
Latitude when first Sighted 40.9455	Longitude when first Sighted 73.9455	Latitude when last Sighted 40.9455	Longitude when last Sighted 73.9455	Distance at first Sighting (m) 200	Closest Range to Animal (m) 200

Detection Description

Animal Common Name Whale, Humpback	Certainty of Identification Most Likely	Description of Animal(s) Low and bushy blow, dark blue ventral side, humped back, low dorsal fin			
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Blow	Pace Slow	Behavior state Other	Individual Behavior Blow	Behavioral Reaction Unknown
Vessel Heading (degree) - 0 = North 90		Relative Bearing to animal (clock face) Bow = 12:00 1:00		Direction of Travel (relative to vessel) Away from the ship	
Detailed narrative of detection	Low bushy blow was seen 200-300m from the vessel about 1:00 from the bow/wheelhouse, facing away from the vessel. The whale then appeared to dive down, you could see the dark blue dorsal side of the animal and the low dorsal fin. The captain was notified by the PSO and kept an eye out for the whale. The animal was not sighted again. Berto Miller was in transit from NY to VA, not yet on CVOW work site.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 2
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Activity - Time - Location

Date First Detected 5/22/2020	Date Last Detected 5/22/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 11.28
Time at first encounter (EDT) 7:34:00 PM	Time of closest to source (EDT) 7:34:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 7:34:00 PM
Latitude when first Sighted 37.3499	Longitude when first Sighted 75.5180	Latitude when last Sighted 37.3499	Longitude when last Sighted 75.5180	Distance at first Sighting (m) 400	Closest Range to Animal (m) 400

Detection Description

Animal Common Name Dolphin, Unidentified	Certainty of Identification Sure	Description of Animal(s)	Saw dark falcate shaped dorsal fin (vs. triangular). Only saw once then disappeared. Dorsal was wide/broad.		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Dorsal	Pace Moderate	Behavior state Surface-Active Travel	Individual Behavior Porpoising	Behavioral Reaction Unknown
Vessel Heading (degree) - 0 = North 233		Relative Bearing to animal (clock face) Bow = 12:00 3:00		Direction of Travel (relative to vessel) Crossing perpendicular ahead of ship	
Detailed narrative of detection	Saw dolphin porpoise once about 400 m away at 3:00 clockface from wheelhouse. The dorsal fin seen was falcate and porpoised then submerged and was not seen again. The captain was notified and the PSO continued watching for animals but no others were seen. Berto Miller was in transit to Chesapeake Bay away from CVOW work site, Vole au Vent had not yet arrived on site.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 3
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Activity - Time - Location

Date First Detected 5/23/2020	Date Last Detected 5/23/2020	Observation Type Daylight Visual	Survey Activity Oth - Vessel Transit	Energy Source(s) -	Water Depth (m) 16.15
Time at first encounter (EDT) 5:36:00 PM	Time of closest to source (EDT) 5:36:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 5:39:00 PM
Latitude when first Sighted 36.9602	Longitude when first Sighted 76.0579	Latitude when last Sighted 36.9558	Longitude when last Sighted 76.0404	Distance at first Sighting (m) 500	Closest Range to Animal (m) 500

Detection Description

Animal Common Name Dolphin, Unidentified	Certainty of Identification Sure	Description of Animal(s)	Several dark falcate dorsal fins seen in splashing water. Dorsal fins were porpoising in and out of water. Sighting cues given by birds diving above the water, and splashing from dolphins indicate likely feeding on bait fish.		
Best 4	Min 3	Max 6	Adults 4	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Birds	Pace Moderate	Behavior state Other	Individual Behavior Feeding on observed fish	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 104		Relative Bearing to animal (clock face) Bow = 12:00 10:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	PSO noticed birds diving into the water about 500m from the wheelhouse at 10:00 clockface. Noticed splashing and then saw dorsal fins of dolphins porpoising and splashing, suspected feeding on bait fish. Berto Miller continued course of action and last sighting of dolphins was at 17:39 when dolphins were at 7:00 clockface from wheelhouse about 1000m, continuing same behavior when first sighted. Berto Miller was in transit to CVOW work site, Vole au Vent had yet to arrive on site.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 4
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Activity - Time - Location

Date First Detected 5/25/2020	Date Last Detected 5/25/2020	Observation Type Daylight Visual	Survey Activity Mit - Pre Watch Clearance	Energy Source(s) -	Water Depth (m) 27.12
Time at first encounter (EDT) 12:09:00 PM	Time of closest to source (EDT) 12:09:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 12:09:00 PM
Latitude when first Sighted 36.8927	Longitude when first Sighted 76.4732	Latitude when last Sighted 36.8927	Longitude when last Sighted 76.4732	Distance at first Sighting (m) 1950	Closest Range to Animal (m) 1950

Detection Description

Animal Common Name Dolphin, Common	Certainty of Identification Most Likely	Description of Animal(s)	Falcate dorsal fin and grey patch towards the back of the body/characteristic of the hour glass shape		
Best 3	Min 3	Max 5	Adults 3	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Vigorous	Behavior state Fast Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 337		Relative Bearing to animal (clock face) Bow = 12:00 2:30		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	100m from BM. Dolphins seen porpoising and traveling in the opposite direction of the Berto Miller, traveling relatively fast. Group was seen approximately 100m from the Berto Miller and 1950m from the Vole au Vent. Porpoised out of the water twice and then disappeared. First seen at about 2:30 clockface from the wheelhouse. Team on the Vole au Vent was notified at the time of the sighting but visual confirmation could not be made by their PSOs. Dolphins were in the mitigation zone during preclearance, but no mitigation was necessary as they were not seen within the exclusion zone and pile driving was not active at the time of sighting.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 5
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Activity - Time - Location

Date First Detected 5/29/2020	Date Last Detected 5/29/2020	Observation Type Daylight Visual	Survey Activity Oth - Weather Downtime	Energy Source(s) -	Water Depth (m) 26.21
Time at first encounter (EDT) 10:53:00 AM	Time of closest to source (EDT) 10:53:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 10:54:00 AM
Latitude when first Sighted 36.8962	Longitude when first Sighted 75.4632	Latitude when last Sighted 36.8962	Longitude when last Sighted 75.4632	Distance at first Sighting (m) 2	Closest Range to Animal (m) 0

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Most Likely	Description of Animal(s)	Orange hued body, round carapace, prominent front flippers		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Slow	Behavior state Rest/Slow Travel	Individual Behavior Other	Behavioral Reaction Unknown
Vessel Heading (degree) - 0 = North 333		Relative Bearing to animal (clock face) Bow = 12:00 11:30		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	Loggerhead approximately 0.5m long was seen an estimated 2m from the bow of the Berto Miller, under the surface of the water. Distinct characteristics could not be made out as the animal never surfaced, but rusty orange hue for body coloration and slowly moving front slippers could be seen. Captain was notified and brought engines to neutral as safely and quickly as possible. As vessel approached turtle, the turtle appeared to go under the boat (unclear if the turtle made attempt to dive below the vessel). Turtle was not sighted again. Turtle was an estimated 1.3nm from the Vole au Vent. Vole au Vent was on weather standby and the Berto Miller was running weather patterns at the time of sighting.				

Mitigation – Compliance - Other

What action requested? Mit - Change Course	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance Yes	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 6
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Activity - Time - Location

Date First Detected 5/29/2020	Date Last Detected 5/29/2020	Observation Type Daylight Visual	Survey Activity Mit - Delay Ramp Up/Soft Start	Energy Source(s) -	Water Depth (m) 25
Time at first encounter (EDT) 1:38:00 PM	Time of closest to source (EDT) 1:38:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 1:42:00 PM
Latitude when first Sighted 36.8816	Longitude when first Sighted 75.4963	Latitude when last Sighted 36.8816	Longitude when last Sighted 75.4963	Distance at first Sighting (m) 1860	Closest Range to Animal (m) 1860

Detection Description

Animal Common Name Dolphin, Unidentified	Certainty of Identification Sure	Description of Animal(s)	Single dolphin about 4 feet/1.2m in length from rostrum to flukes. No other dolphins were seen with this individual. Dark colored dorsal and underneath, possible spotting. Small/slender rostrum and falcate dorsal fin.		
Best 1	Min 1	Max 1	Adults 0	Juveniles 1	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Vigorous	Behavior state Other	Individual Behavior Porpoising	Behavioral Reaction Unknown
Vessel Heading (degree) - 0 = North 349		Relative Bearing to animal (clock face) Bow = 12:00 7:00		Direction of Travel (relative to vessel) Toward the ship	
Detailed narrative of detection	Dolphin first sighted by crew who notified PSOs, said to be behind the vessel in the wake. PSO first sighted dolphin when it popped up about 3m from the port side of the stern of the Berto L Miller. The dolphin was smaller, approximately 1.2m in length and suspected to be a juvenile. Both the dorsal and ventral sides of the dolphin were dark in color. Dolphin porpoised in wake for a few seconds and then disappeared, no individuals were sighted. Vole au Vent PSOs were notified, but secondary visual confirmation could not be made. No mitigation was required as the individual was behind the transiting vessel and outside of the exclusion zone for the Vole au Vent.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 7
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Activity - Time - Location

Date First Detected 5/29/2020	Date Last Detected 5/29/2020	Observation Type Daylight Visual	Survey Activity Mit - Delay Ramp Up/Soft Start	Energy Source(s) -	Water Depth (m) 25
Time at first encounter (EDT) 1:50:00 PM	Time of closest to source (EDT) 1:50:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 1:51:00 PM
Latitude when first Sighted 36.8979	Longitude when first Sighted 75.5113	Latitude when last Sighted 36.8979	Longitude when last Sighted 75.5113	Distance at first Sighting (m) 1750	Closest Range to Animal (m) 1750

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Most Likely	Description of Animal(s)	Brownish-orange carapace and scutes, with prominent yellow beak and skin on head and dark rimmed eyes.		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Stationary	Behavior state Rest/Slow Travel	Individual Behavior None	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 352		Relative Bearing to animal (clock face) Bow = 12:00 3:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Loggerhead was sighted approximately 100m off the starboard midship of the Berto Miller, and approximately 1750m from the Vole au Vent. The Berto Miller was transiting in circles for a pre-watch. Turtle was seen outside of the regulated 1000m exclusion zone; PSOs onboard the Vole au Vent were notified but no mitigation was required. Carapace of turtle could be seen from the surface; turtle lifted head to breath twice before it was not seen again.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 8
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Activity - Time - Location

Date First Detected 5/29/2020	Date Last Detected 5/29/2020	Observation Type Daylight Visual	Survey Activity Oth - Weather Downtime	Energy Source(s) -	Water Depth (m) 14.33
Time at first encounter (EDT) 2:29:00 PM	Time of closest to source (EDT) 2:29:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 2:29:00 PM
Latitude when first Sighted 36.8985	Longitude when first Sighted 75.4624	Latitude when last Sighted 36.8985	Longitude when last Sighted 75.4624	Distance at first Sighting (m) 50	Closest Range to Animal (m) 50

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Sure	Description of Animal(s)	Orange circular/round carapace with barnacles covering carapace.		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Stationary	Behavior state Rest/Slow Travel	Individual Behavior None	Behavioral Reaction Dive
Vessel Heading (degree) - 0 = North 132		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Loggerhead was sighted approximately 50 m off the port bow of the Berto Miller during transit to anchor. The captain was notified immediately and slowed down. The turtle appeared to be basiking in the sun, sat for a few moments more and then dove down. Turtle was not sighted again. Berto Miller was an estimated 2790m (1.5nm) from the Vole au Vent, which was on weather standby.				

Mitigation – Compliance - Other

What action requested? Mit - Change Course	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 9
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Activity - Time - Location

Date First Detected 5/29/2020	Date Last Detected 5/29/2020	Observation Type Daylight Visual	Survey Activity Oth - Weather Downtime	Energy Source(s) -	Water Depth (m) 30.48
Time at first encounter (EDT) 2:42:00 PM	Time of closest to source (EDT) 2:42:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 2:44:00 PM
Latitude when first Sighted 36.8965	Longitude when first Sighted 75.4477	Latitude when last Sighted 36.8965	Longitude when last Sighted 75.4477	Distance at first Sighting (m) 60	Closest Range to Animal (m) 15

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Sure	Description of Animal(s)	Rusty orange colored carapace with numerous barnacles; visible front and hind flippers.		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Stationary	Behavior state Rest/Slow Travel	Individual Behavior None	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 30		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Loggerhead turtle, approximately 0.5m in size, was seen an estimated 60m off the port bow of the Berto Miller when transiting to anchor. The captain was notified and engaged engines to neutral. The Berto Miller coasted past the turtle, whose closest point of approach was an estimated 15m off the port midship. The turtle showed no signs of reaction to the passing vessel, and remained stationary at the surface with its head down and flippers moving but not propelling the body in any direction. Approximately 30-40% of the carapace was covered in barnacles. Once the turtle was behind the vessel, PSOs gave clearance for vessel to proceed to anchorage. Vole au Vent was an estimated 3871m away (2.09nm) at the time of sighting, and was on a weather standby.				

Mitigation – Compliance - Other

What action requested? Mit - Change Course	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance Yes	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 10
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Activity - Time - Location

Date First Detected 5/30/2020	Date Last Detected 5/30/2020	Observation Type Daylight Visual	Survey Activity Ops - Pre-Installation Foundation	Energy Source(s) -	Water Depth (m) 22.25
Time at first encounter (EDT) 5:38:00 AM	Time of closest to source (EDT) 5:39:00 AM	Time animal entered EZ (EDT) 5:38:00 AM	Time animal left EZ (EDT) 5:41:00 AM	Time animal in the EZ (hh:mm) 00:03	Time at end of encounter (EDT) 5:41:00 AM
Latitude when first Sighted 36.9030	Longitude when first Sighted 75.4690	Latitude when last Sighted 36.9108	Longitude when last Sighted 75.4808	Distance at first Sighting (m) 200	Closest Range to Animal (m) 150

Detection Description

Animal Common Name Dolphin, Bottlenose	Certainty of Identification Most Likely	Description of Animal(s)	Tall, falcate dorsal fins; large, robust, gray bodies, no distinct color pattern; short beaks		
Best 10	Min 8	Max 15	Adults 10	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Moderate	Behavior state Surface-Active Travel	Individual Behavior Fluke up	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 300		Relative Bearing to animal (clock face) Bow = 12:00 11:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	Group of 10-15 bottlenose dolphins first seen an estimated 200m from port bow of Berto Miller at 05:38, with a CPA of 150m off port midship at 05:39. Captain was made aware of the dolphins and monitored vessel transit in relation to pod. Dolphins were milling about at the surface with frequent fluking and surfacing. Animals appearing to be traveling in a group. Vessel was circling Vole au Vent at 1nm prior to pre-watch and no mitigation was required. Dolphins were last seen at 400m off the port stern of the Berto Miller at 05:41. Vole au Vent PSOs were notified. PAM operator detected dolphins at the same time.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) Yes	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 12
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Activity - Time - Location

Date First Detected 5/30/2020	Date Last Detected 5/30/2020	Observation Type Daylight Visual	Survey Activity Mit - Pre Watch Clearance	Energy Source(s) -	Water Depth (m) 21.95
Time at first encounter (EDT) 6:54:00 AM	Time of closest to source (EDT) 6:54:00 AM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 6:54:00 AM
Latitude when first Sighted 36.9130	Longitude when first Sighted 75.4911	Latitude when last Sighted 36.9130	Longitude when last Sighted 75.4911	Distance at first Sighting (m) 1865	Closest Range to Animal (m) 1865

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Sure	Description of Animal(s)	Brownish-orange round carapace. Carapace had barnacles covering it. About 0.5 m long.		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Stationary	Behavior state Rest/Slow Travel	Individual Behavior None	Behavioral Reaction Dive
Vessel Heading (degree) - 0 = North 268		Relative Bearing to animal (clock face) Bow = 12:00 2:30		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Loggerhead turtle was sighted about 5 m from the Berto Miller starboard side while circling the Vole au Vent at a distance of 1nm for pre-watch. Turtle was only seen momentarily and then dove down below the surface. Captain of the Berto Miller was notified as well as the Vole au Vent PSOs. No mitigation was required, as turtle was outside the 1000m exclusion zone for turtles.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 13
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Activity - Time - Location

Date First Detected 5/30/2020	Date Last Detected 5/30/2020	Observation Type Daylight Visual	Survey Activity Mit - Post Piling Watch	Energy Source(s) -	Water Depth (m) 26.52
Time at first encounter (EDT) 12:57:00 PM	Time of closest to source (EDT) 12:57:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 12:57:00 PM
Latitude when first Sighted 36.9003	Longitude when first Sighted 75.4720	Latitude when last Sighted 36.9003	Longitude when last Sighted 75.4720	Distance at first Sighting (m) 1860	Closest Range to Animal (m) 1860

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Sure	Description of Animal(s)	Brownish-orange round carapace. Carapace had barnacles covering it. About 0.3 m long.		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Stationary	Behavior state Rest/Slow Travel	Individual Behavior None	Behavioral Reaction Dive
Vessel Heading (degree) - 0 = North 339		Relative Bearing to animal (clock face) Bow = 12:00 8:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Loggerhead turtle was sighted about 8:00 clockface from midship on the Berto Miller, slightly in boat wake about 3m from vessel. Captain of Berto Miller was notified as well as Vole au Vent team. Turtle was only seen momentarily and then dove. Berto Miller was circling the Vole au Vent for post-watch after pile driving. No mitigation was required.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 14
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Activity - Time - Location

Date First Detected 5/30/2020	Date Last Detected 5/30/2020	Observation Type Daylight Visual	Survey Activity Ops - Anode Cage/TP Installation	Energy Source(s) -	Water Depth (m) 18.59
Time at first encounter (EDT) 2:30:00 PM	Time of closest to source (EDT) 2:30:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 2:30:00 PM
Latitude when first Sighted 36.8768	Longitude when first Sighted 75.5936	Latitude when last Sighted 36.8768	Longitude when last Sighted 75.5936	Distance at first Sighting (m) 500	Closest Range to Animal (m) 500

Detection Description

Animal Common Name Sea Turtle, Loggerhead	Certainty of Identification Sure	Description of Animal(s)	Brownish carapce seen from distance with naked eye. Large distinctive barnacles on carapace.		
Best 1	Min 1	Max 1	Adults 1	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Stationary	Behavior state Rest/Slow Travel	Individual Behavior None	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 280		Relative Bearing to animal (clock face) Bow = 12:00 3:00		Direction of Travel (relative to vessel) Stationary	
Detailed narrative of detection	Loggerhead turtle seen 3:00 clockface, 500 m, from the starboard bow of the Berto Miller while the vessel was transiting back to dock in Virginia. The turtle seemed to be sunning itself and appeared to be moving, swimming a little at surface, as the vessel passed. Turtle remained in position and no reaction to the vessel was evident. No mitigation was required.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 15
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Activity - Time - Location

Date First Detected 5/30/2020	Date Last Detected 5/30/2020	Observation Type Daylight Visual	Survey Activity Ops - Anode Cage/TP Installation	Energy Source(s) -	Water Depth (m) 20.42
Time at first encounter (EDT) 4:30:00 PM	Time of closest to source (EDT) 4:30:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 4:30:00 PM
Latitude when first Sighted 36.9461	Longitude when first Sighted 75.9967	Latitude when last Sighted 36.9461	Longitude when last Sighted 75.9967	Distance at first Sighting (m) 300	Closest Range to Animal (m) 300

Detection Description

Animal Common Name Dolphin, Bottlenose	Certainty of Identification Sure	Description of Animal(s) Tall, falcate dorsal fin, large, robust, gray body			
Best 2	Min 2	Max 2	Adults 2	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Moderate	Behavior state Medium Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 292		Relative Bearing to animal (clock face) Bow = 12:00 3:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	Group of 2 bottlenose dolphins first seen an estimated 300m off the starboard midship of Berto Miller at 16:30, with a CPA of 300m at 16:30. Captain was made aware of the dolphins and monitored vessel transit in relation to pod. Dolphins surfaced twice and were not seen again after 16:30.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken No



PROTECTED SPECIES - INDIVIDUAL VISUAL DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 16
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Activity - Time - Location

Date First Detected 5/30/2020	Date Last Detected 5/30/2020	Observation Type Daylight Visual	Survey Activity Ops - Anode Cage/TP Installation	Energy Source(s) -	Water Depth (m) 13.10
Time at first encounter (EDT) 5:08:00 PM	Time of closest to source (EDT) 5:08:00 PM	Time animal entered EZ (EDT) -	Time animal left EZ (EDT) -	Time animal in the EZ (hh:mm) -	Time at end of encounter (EDT) 5:09:00 PM
Latitude when first Sighted 36.9822	Longitude when first Sighted 76.1318	Latitude when last Sighted 36.9822	Longitude when last Sighted 76.1318	Distance at first Sighting (m) 500	Closest Range to Animal (m) 500

Detection Description

Animal Common Name Dolphin, Bottlenose	Certainty of Identification Best Guess	Description of Animal(s)	Dark gray coloration, falcate dorsal fin		
Best 2	Min 1	Max 2	Adults 2	Juveniles 0	Calves 0
Sex Class Indeterminate	Sighting Cue Body	Pace Moderate	Behavior state Surface-Active Travel	Individual Behavior Porpoising	Behavioral Reaction None
Vessel Heading (degree) - 0 = North 280		Relative Bearing to animal (clock face) Bow = 12:00 9:00		Direction of Travel (relative to vessel) Parallel to ship in opposite direction	
Detailed narrative of detection	Captain first sighted dolphin and notified PSO. Suspected 2 individual dolphins surfaced twice in rapid succession approximately 500m from the Berto Miller, showing dark coloration and falcate dorsal fin. Other characteristics were difficult to see. Dolphins were headed in the opposite direction of the vessel, closer to land while vessel was in transit past the Chesapeake Bay Bridge and Tunnel. Dolphins were not seen surfacing again and no mitigation was required.				

Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (PAM) No	Was animal photograph taken Yes



PROTECTED SPECIES - INDIVIDUAL ACOUSTIC DETECTION SUMMARY

Lease Reference CVOW-1	Vessel Name Berto Miller	Operational Type Pile Driving	Client JDN	Operator Dominion	Detection Number 1
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Activity - Time - Location

Date First Detected 5/30/2020	Date Last Detected 5/30/2020	Observation Type Daylight PAM	Survey Activity Ops - Pre-Installation Foundation	Energy Source(s) -	Water Depth (m) 22.25
Time at first encounter (EDT) 5:38:00 AM	Time of closest to source (EDT) 5:39:00 AM	Time animal entered EZ (EDT) 5:38:00 AM	Time animal left EZ (EDT) 5:41:00 AM	Time animal in the EZ (hh:mm) 00:03	Time at end of encounter (EDT) 6:30:00 AM
Latitude when first Detected 36.9030	Longitude when first Detected 75.4690	Latitude when last Detected 36.9108	Longitude when last Detected 75.4808	Distance at first Detection (m) -	Closest Range to Animal (m) 150

Detection Description

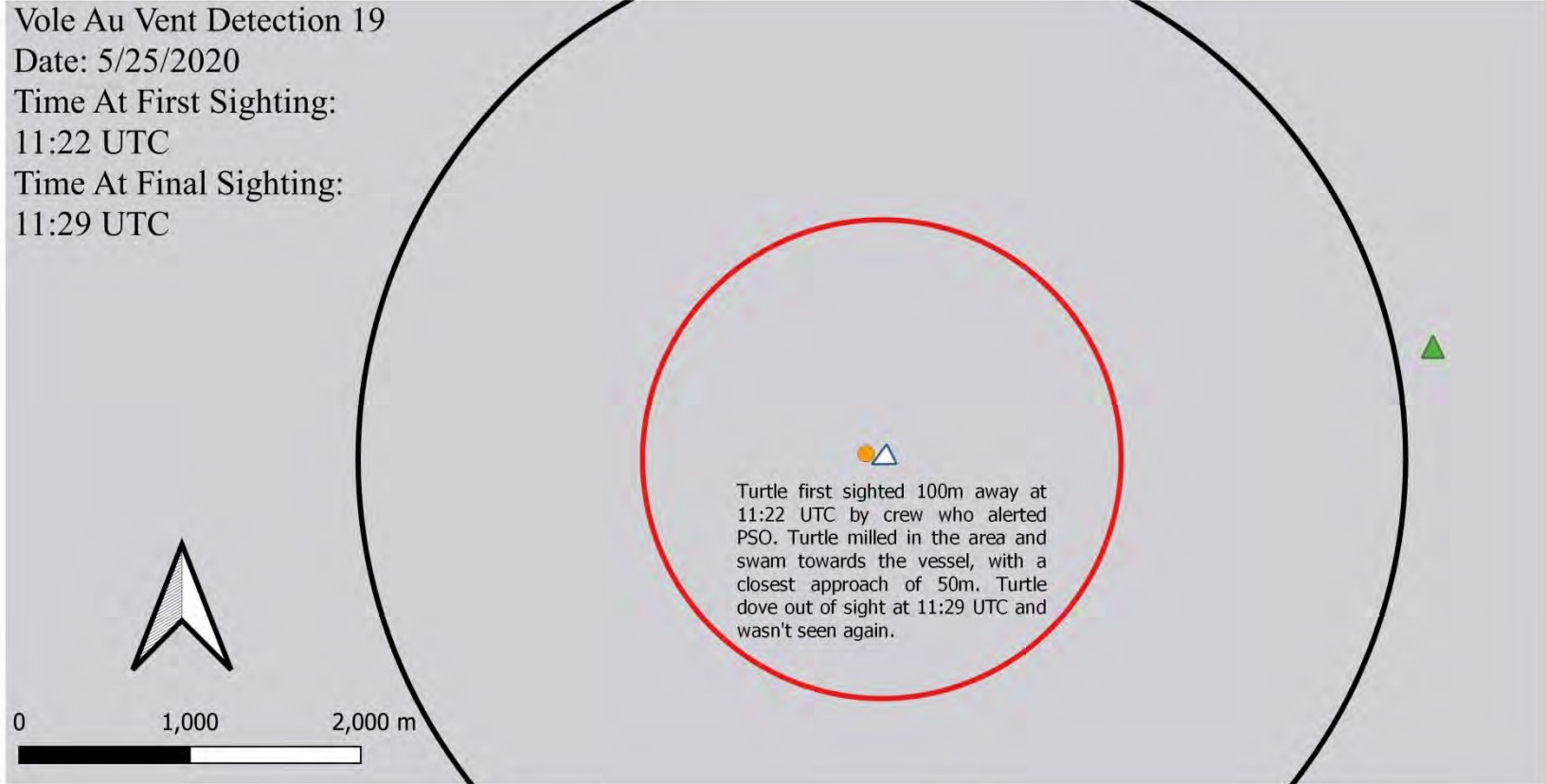
Animal Common Name Dolphin, Bottlenose	Certainty of Identification Most Likely	Call Characteristics	Upsweep, Downsweep, Sinusoidal, and repeating whistles, buzzes, burst pulses, HF clicks & click trains		
Best 10	Min 8	Max 15	Call Type Whistle	Detection Module Observed on spectrogram display	
Frequency range (kHz) 23.5 - 178	Primary Frequency (kHz) 38	Max Amplitude (dB) 160	Bearings Obtained Yes	Localization Method Visual	Distance Estimated Confirmed by visual Observer

Detailed narrative of detection	<p>Animals first sighted by visual observers. Second PSO went inside to get information from PAMGuard. Dolphins were most active on PAMGuard between 05:38 and 05:43, when high frequency clicks could be seen starting at 120dB and moving to a peak amplitude of 160dB. The high frequency screen at this time was virtually full of clicks, ranging from 13.5kHz to 178kHz, with peak frequencies ranging from 28kHz to 64kHz. The bearing display indicated dolphins were located about 60 degrees off the bow and 100 degrees from the bow (congruent with PSO sighting off the port side moving from 11:00 clock face to the stern). These high frequency clicks could be heard aurally, as well as seen on the spectrogram display. Clicks were fairly loud, producing a strong signal strength and an upper range of up to 250kHz, but with most below 218kHz. Clicks were not detected on the high frequency click detector screen after about 05:43, concurrent with the visual observer losing sight of the group. The low-mid frequency spectrogram displayed stacked whistles, indicating at least 5 individuals (PSO observed an estimated 10 individuals) from the same time period of 05:38-05:43. The majority of the whistles were frequency modulated upsweeps and downsweeps, with a few sinusoidal and flat tonal whistles, and a number of the same whistles repeated three or more times in a row. Whistles ranged from 3.6-24.6kHz, with the majority staying below 17kHz. Buzzes and burst pulses could also be heard aurally as well as seen on the spectrogram display. Buzzes had a high range of up to 125.6kHz. Burst pulses varied in sound, with some sounding like squeaks, and lasted less than half a second. Additionally, two distinct, short, and loud noises could be heard that were much more prominent than the clicks being produced, which the PAM operator suspects could be aggressive jaw claps. As the high frequency diminished and could no longer be seen on the display, whistles, and some lower frequency clicks, were continued to be detected aurally and visually on the spectrogram until 06:30; whistles became fainter as time passed, until only detected aurally and not visually in the last 5 minutes. While the Berto Miller observer had lost sight of the pod, due to the movement of the pod in the opposite direction of the vessel's travel, the PAM operator could hear the dolphins until 06:30, and had been communicating with the Vole au Vent PSOs, which sighted a similarly sized group of dolphins at 06:06. Due to the continued nature of the PAM detection, it is suspected to be the same group of dolphins.</p>
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Mitigation – Compliance - Other

What action requested? Mit - No Action required	Was action implemented? Yes	Time Mitigation Started (EDT) -	Time Mitigation Ended (EDT) -	Estimated Loss Time (Mitigation) -	Regulatory Status Compliance
IHA Take (Yes/No) No	Number of Take (# of animals) 0	Vessel strike Avoidance No	Injured/Death Marine mammal No	Dual Detection (visual) Yes	PAM Spectrogram Image Yes

**Appendix F. Renditions of Protected Species Sightings in Relation to OIV Vole au
Vent During on Pile Driving Days**



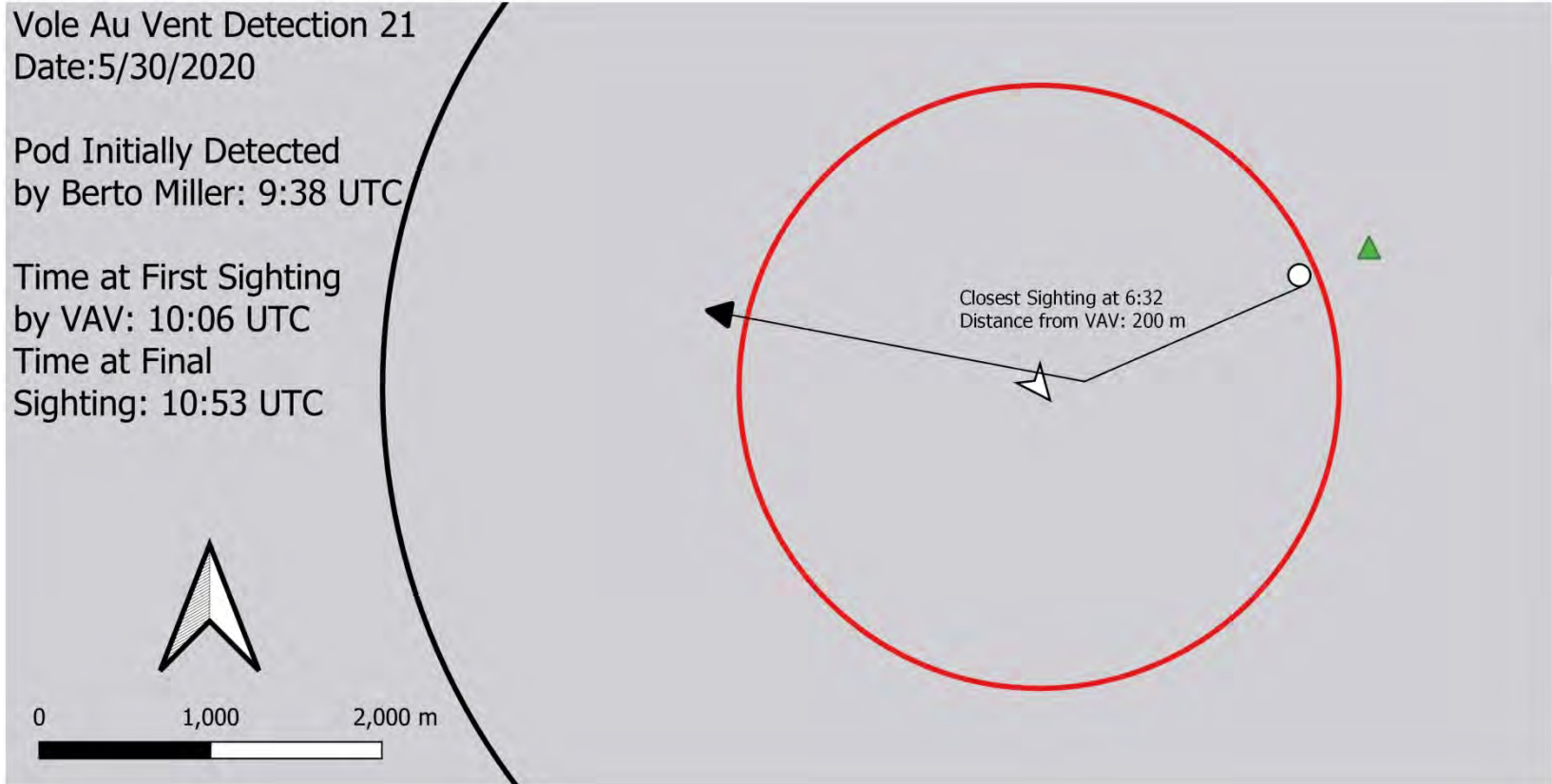
Vessel Activity at First Sighting:
 Ops - Pre-Installation Foundation

List all Sources Active:
 None

Mitigation Action Requested:
 None

Legend

- Location and Heading of Vole Au Vent
- Loggerhead Turtle
- Location of Berto Miller
- 1750m Exclusion Zone
- 3830m Monitoring Zone



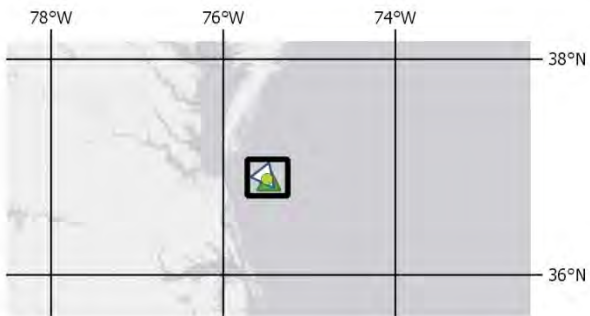
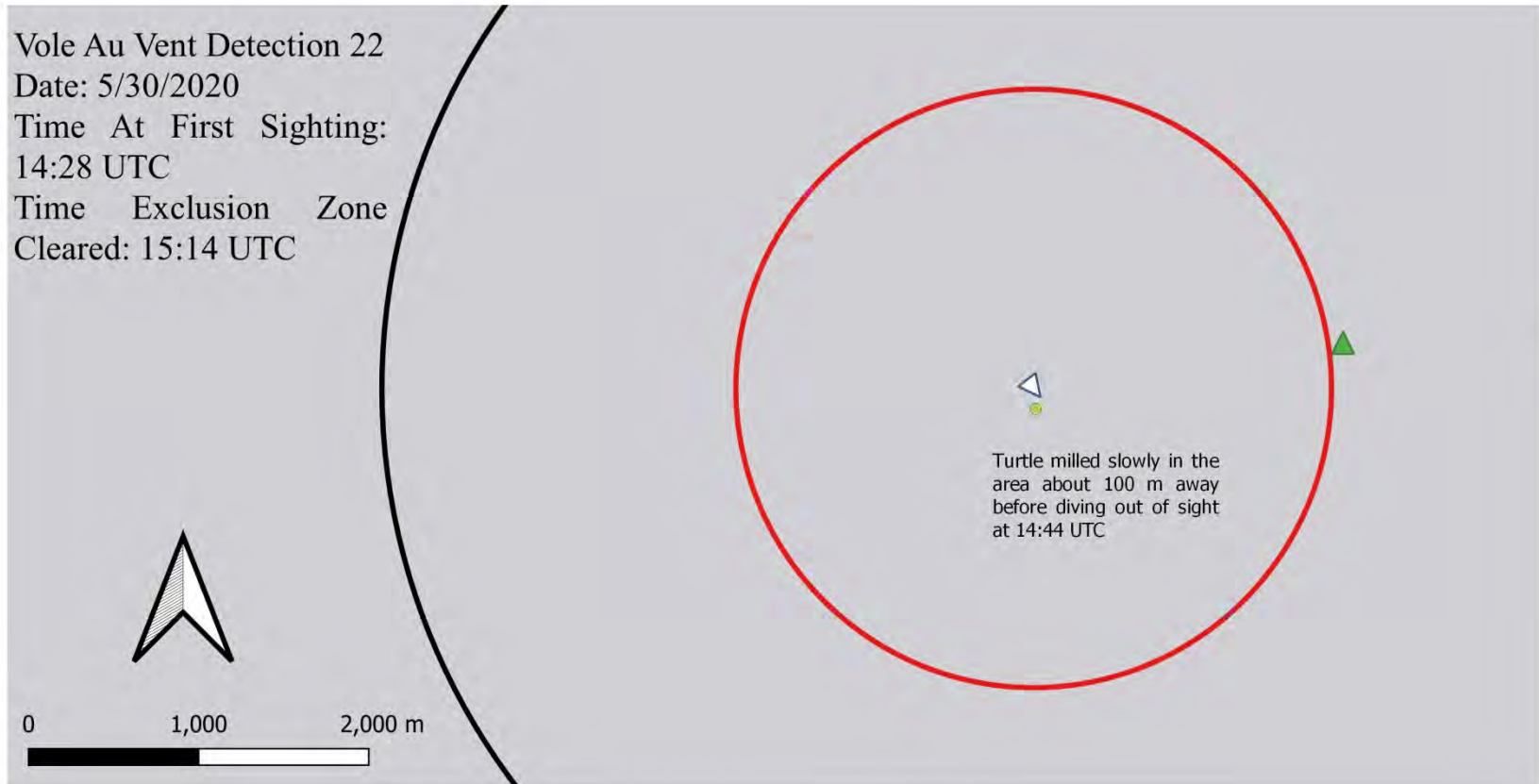
Vessel Activity at First Sighting:
Pre-Watch Clearance

Energy Source Status:
Inactive

Mitigation Action Requested:
None

Legend

- First Sighting of Bottlenose Dolphins by VAV PSO's
- ↖ Location and Heading of the Vole Au Vent
- ▲ Location of Berto Miller at Initial Sighting
- 1750m Exclusion Zone
- 3830m Monitoring Zone



Vessel Activity at First Sighting:
 Ramp up/Soft Start

List all Sources Active:
 Pile Driving

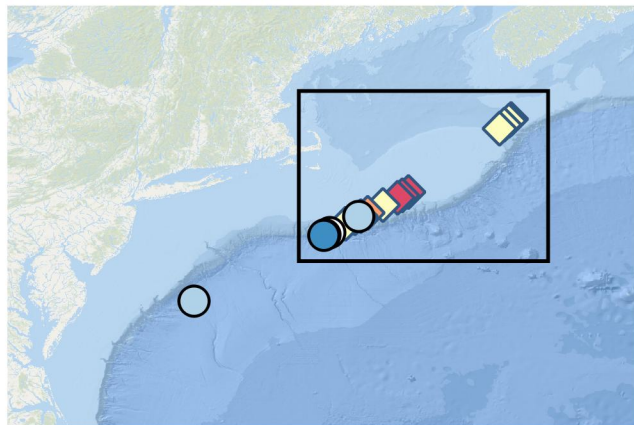
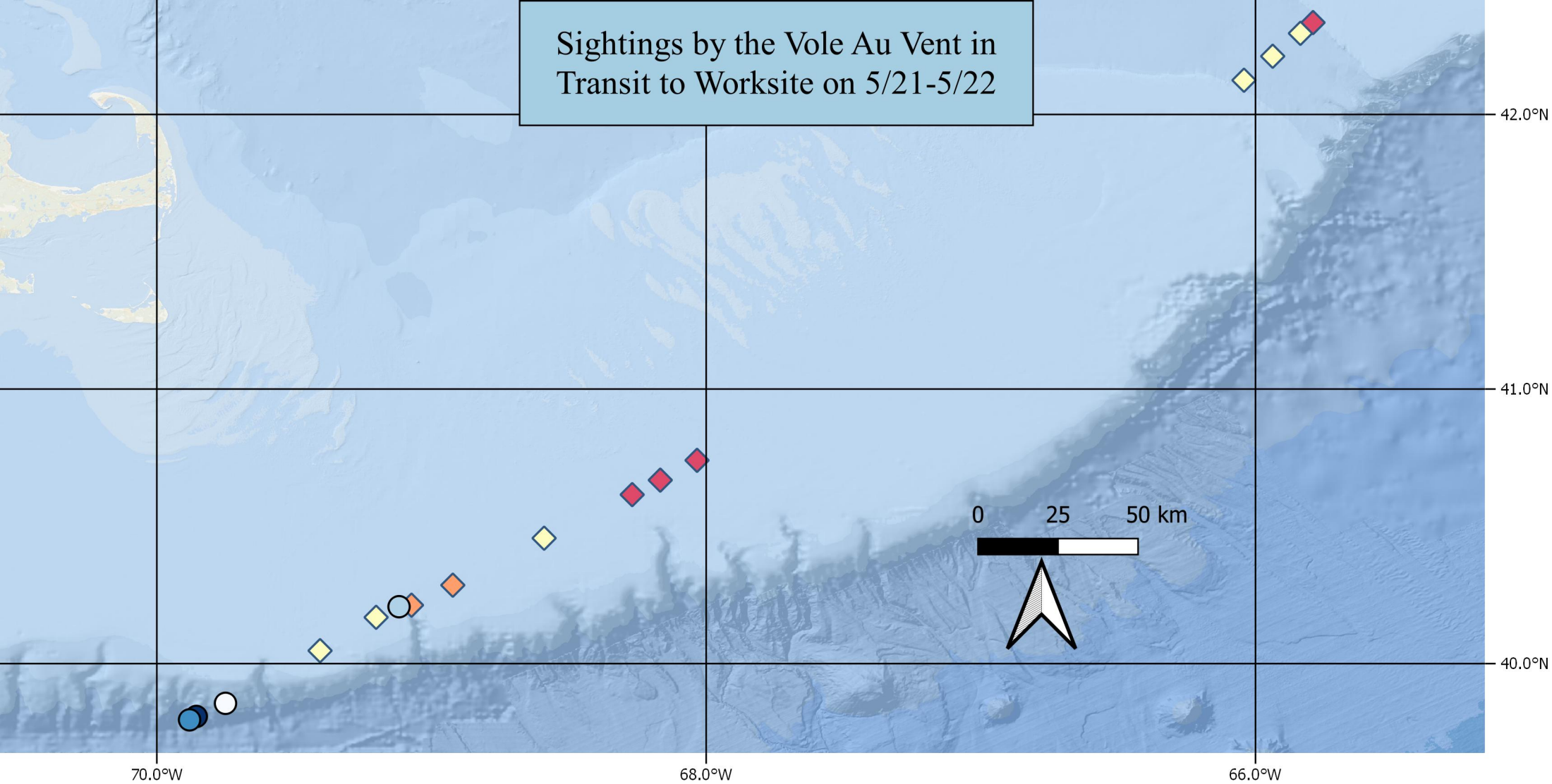
Mitigation Action Requested:
 Delay Ramp Up/Soft Start
 Delay Time: 0:43

Legend

- Loggerhead Sea Turtle
- ◁ Location and Bearing of Vole Au Vent
- ▲ Location of Berto Miller
- 1750m Exclusion Zone
- 3830m Monitoring Zone

**Appendix G. Renditions of Protected Species Sightings in Relation to OIV Vole au
Vent During Pre-Construction Transit**

Sightings by the Vole Au Vent in Transit to Worksite on 5/21-5/22



These sightings occurred when the Vole Au Vent was in transit to the work site from Halifax. There were five dolphin sightings of three different species and twelve whale sightings of two different species. There was one sighting of unidentified dolphins and six sightings of unidentified whales. All points represent the location of the Vole Au Vent when the animal was originally sighted.



Legend

Dolphin Sightings by Species

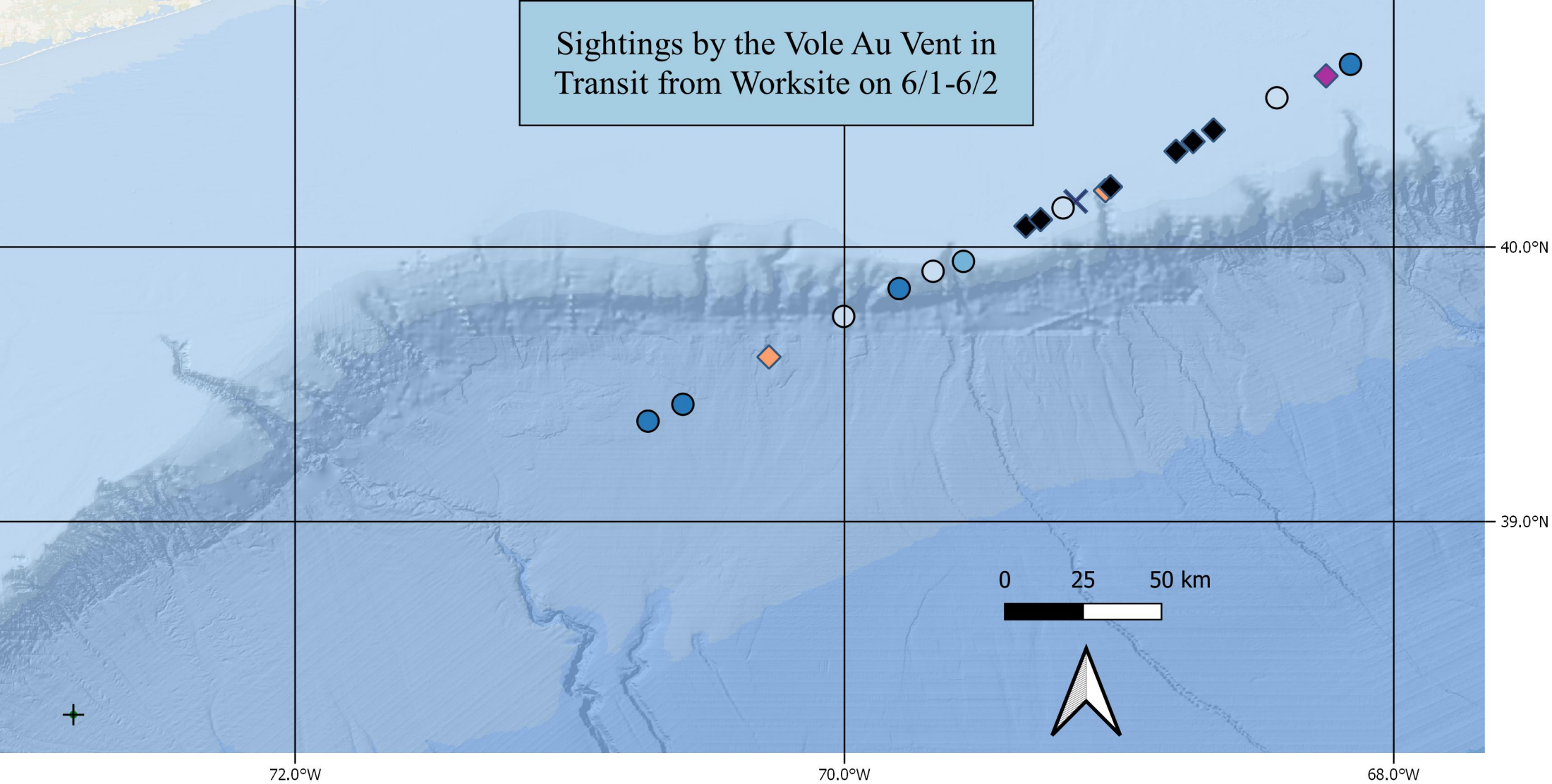
- Bottlenose
- Common
- Risso
- Unidentified Dolphin

Whale Sightings by Species

- ◆ Humpback
- ◆ Sperm
- ◆ Unidentified Whale

Appendix H Renditions of Protected Species Sightings in Relation to OIV Vole au Vent During Post-Construction Transit

Sightings by the Vole Au Vent in Transit from Worksite on 6/1-6/2



72.0°W

70.0°W

68.0°W

40.0°N

39.0°N

0 25 50 km

These sightings occurred when the Vole Au Vent was in transit from the work site to Halifax. There were ten dolphin sightings of three different species and ten whale sightings of four different species. There was four sightings of unidentified dolphins and no sightings of unidentified whales. All points represent the location of the Vole Au Vent when the animal was originally sighted.

Legend

Dolphin Sightings by Species

- + Clymene
- Common
- Risso
- Unidentified Dolphin

Whale Sightings by Species

- ◆ Fin
- ◆ Minke
- × North Atlantic Right
- ◇ Sperm

