Annual Marine Monitoring Report
Parallel Thimble Shoal Tunnel Project
Virginia Beach, Virginia

Prepared by:

Chesapeake Tunnel Joint Venture
2377 Ferry Road
Virginia Beach, Virginia 23455

Submitted to:
National Marine Fisheries Service
Office of Protected Resources
1315 East-West Highway
Silver Spring, Maryland 20910-3226

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ACRONYMS AND ABBREVIATIONS

CTJV	**Chesapeake Tunnel Joint Venture**
DTH	**Down the Hole**
GPS	**Global Positioning System**
IHA	**Incidental Harassment Authorization**
IPP	**Interlocking Pipe Pile**
MHW	**Mean High Water**
MMMP	**Marine Mammal Monitoring Plan**
PSO	**Protected Species Observer**
NOAA	**National Oceanic and Atmospheric Administration**
NOAA Fisheries	**National Marine Fisheries Service**
PTS	**Permanent Threshold Shift**
PTST	**Parallel Thimble Shoal Tunnel**
SOE	**Support of Excavation**
TBM	**Tunnel Boring Machine**

1. EXECUTIVE SUMMARY

Under the Incidental Harassment Authorization (IHA) renewal, issued by NOAA March 9, 2021, a total of 138 -36" steel pipe piles were driven, 25 of which were driven to final grade, on the project. This work was performed with the use of a Down The Hole (DTH) hammer, traditional impact and vibratory driving.

In-water pile driving construction under this IHA renewal was done from March 9-17th, when production was halted due to unforeseen geological conditions that required a redesign of the Omega Trestle/ Berm. Pile driving resumed only on Island 1 on June 5th until November 16th, when CTJV received the new IHA. In those months 101 days were spent driving in- water piles (below Mean High Water (MHW) or 10 feet). Of those days Protected Species Observers (PSOs) were onsite 142 days to observe both upland and in-water pile installation. There were a total of 829 marine mammals observed in this time period. 823 of the sightings were of bottlenose dolphins, with the possibility of 103 of those sightings being duplicates of already observed individual dolphins. There were also 6 harbor seal sightings. Of these signings, 2 Level A harassment for harbor seals were recorded and only 12 Level B harassments occurred for bottlenose dolphins in this time frame.

A new IHA was issued on November 16, 2021. The work to be performed under that authorization will be nearly identical to the activities evaluated in the March 9, 2021 IHA renewal, specifically, the location, timing, and type of pile driving activities. The need for the new IHA prior to the expiration of the March 9th issued authorization was due to necessary project redesigns that included the installation of additional 42" hollow steel piles and to account for the 36" steel piles that would not be installed under the previous IHA renewal's timeframe due to significant project delays.

2. INTRODUCTION

The CTJV's Parallel Thimble Shoal Tunnel (PTST) project consists of the construction of a two-lane parallel tunnel to the west of the existing Thimble Shoal Tunnel, connecting Portal Island Numbers (Nos.) 1 and 2. Upon completion, the new tunnel will carry two lanes of southbound traffic and the existing tunnel will remain in operation and carry two lanes of northbound traffic. A tunnel boring machine (TBM) will both excavate material and construct the tunnel as it progresses from Portal Island No. 1 to Portal Island No. 2. Precast concrete tunnel segments will be transported to the TBM for installation. The TBM will assemble the tunnel segments in-place as the tunnel is bored. After the tunnel structure is completed, final upland work for the PTST Project will include installation of the final roadway, lighting, finishes, mechanical systems, and

other required internal systems for tunnel use and function. In addition, the existing fishing pier will be repaired and refurbished.

Pile driving activities for the PTST Project have the potential to cause sound levels that exceed Level A and Level B acoustic harassment thresholds for marine mammals, as defined by the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Office of Protected Resources (NOAA Fisheries 2016h) and therefore required the need for an IHA.

This project is occurring in the lower Chesapeake Bay which overlaps with a range of several marine mammal species. The granted March 9, 2021 IHA renewal authorized harassments for five species of marine mammals: harbor seal (*Phoca vitulina*), gray seal *(Halichoerus grypus*), bottlenose dolphin (*Tursiops truncatus*), harbor porpoise (*Phocoena phocoena*) and humpback whale (*Megaptera novaeangliae*). These harassments are associated with pile driving activities related to the PTST Project.

Table 1 displays the number of authorized Level A and Level B harassments permissible under this IHA renewal, organized by species and stock.

Table 1- Authorized Amount of Taking, by Level A Harassment and Level B Harassment, by Species and Stock

Species	Stock	Level A Takes	Level B Takes
Humpback Whale	Gulf of Maine	0	12
Harbor Porpise	Gulf of Maine/ Bay of Fundy	5	7
Bottlenose Dolphin	WNA Coastal, Northern Migratory	142	14,095
	WNA Coastal, Southern Migratory	142	14,095
	NNCES	2	198
Harbor Seal	Western North Atlantic	1,296	2,124
Gray Seal	Western North Atlantic	1	3

3. MONITORING AND METHIDOLOGY

3.1 MONITORING PROCEDURES

The PTST Marine Mammal Monitoring Plan (MMMP)(Appendix A) was revised to reflect updates in the March 9, 2021 issued IHA renewal. This plan served as the protocol for monitoring marine mammals during pile installation activities in the Project Area. The goal of the MMMP was to prevent unauthorized Level A or Level B takes and to minimize Level B harassment using clearly defined methods for monitoring and shutdown procedures during construction.

Protected Species Observers (PSOs) were located in areas of the islands that offered the best available views of the shutdown and monitoring zones. At least one PSO was located on a Portal Island if any type of in-water pile driving is occurring on that Island. At least one additional PSO is required at each active driving rig or other location providing best possible views of the shutdown and monitoring. If the entire Level B monitoring zone is not visible, pile driving activities may continue, and the number of individual animals within the Level B zone will be estimated and recorded.

Marine mammal monitoring must take place from 30 minutes prior to initiation of pile driving activity through 30 minutes post-completion of pile driving activity. Pre-activity monitoring must be conducted for 30 minutes to ensure that the shutdown zone is clear of marine mammals, and pile driving may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, animals shall be allowed to remain in the shutdown zone (i.e., must leave of their own volition) and their behavior shall be monitored and documented.

If a marine mammal enters or is observed within an established shutdown zone, pile driving must be halted or delayed. Pile driving may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without subsequent detections of the animal. Shutdown zones are designated at 100 meters for harbor porpoise and bottlenose dolphins, 15 meters for harbor or gray seals. Humpback whale shutdowns are based on the isopleths depicted in Table 2 , under low-frequency cetaceans for the particular driving scenario taking place. The authorized Level A and B Harassment Zones are depicted in Table 2.

Table 2 —Level A and Level B Harassment Monitoring Zones During Project Activities (meters)

Scenario		Level A Harassment Zones				Level B Monitoring Zones
		Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	
Driving Type	**Pile Type**	**Island 1 & 2**	**Island 1 & 2***	**Island 1 & 2**	**Island 1 & 2**	**Island 1 & 2**
Impact	12-in. Timber	90	--	105	--	25
	36-in. Steel	2,920	105	3,480	1,565	1,585
Impact with Bubble Curtain	36-in. Steel	1,000	--	1,190	535	545
DTH – Impulsive	42-in. Steel	970	--	1,155	520	215
DTH Simultaneous at same island	42-in. Steel	1,535	--	1,830	825	215
DTH & Impact Hammer with bubble curtain: Simultaneous at the same island	36-and 42-in. Steel	1,970	--	2,400	1,055	545
DTH at PI 1. And Impact with Bubble Curtain Hammer at PI 2	36-and 42-in. Steel	970	--	1,155	520	215 from PI 1 545 from PI 2
Continuous (Vibratory)	12-in. Timber	--	--	--	--	1,360
	36-in. Steel	20	--	--	--	21,545
	42-in.** Steel	20	--	--	--	21,545

*indicates that shutdown zone is larger than calculated harassment zone.
**Activity only planned at Portal Island 1 as part of project pile driving plan.

3.2 PROTECTED SPECIES OBSERVER QUALIFICATIONS

The CTJV employed NOAA Fisheries-approved PSOs from REMSA and AZURA, to monitor Level A, Level B and Shutdown Zones. These individuals met the qualifications and experience

outlined in Section 5 of the March 9, 2021 issued IHA renewal. Credentials are provided in Appendix D.

Days where pile installation activities occurred, observers were on site and observation records were completed. The following data was included in the observation records:

- Dates and times (begin and end) of all marine mammal monitoring.
- Construction activities occurring during each daily observation period, including how many and what type of piles were driven or removed and by what method (*i.e.*, impact or vibratory).
- Weather parameters and water conditions during each monitoring period (*e.g.*, wind speed, percent cover, visibility, sea state).
- The number of marine mammals observed, by species, relative to the pile location and if pile driving or removal was occurring at time of sighting.
- Age and sex class, if possible, of all marine mammals observed.
- MMO locations during marine mammal monitoring.
- Distances and bearings of each marine mammal observed to the pile being driven or removed for each sighting (if pile driving or removal was occurring at time of sighting).
- Description of any marine mammal behavior patterns during observation, including direction of travel.
- Number of individuals of each species (differentiated by month as appropriate) detected within the monitoring zone, and estimates of number of marine mammals taken, by species (a correction factor may be applied to total take numbers, as appropriate).
- Detailed information about any implementation of any mitigation triggered (e.g., shutdowns and delays), a description of specific actions that ensued, and resulting behavior of the animal, if any.
- Description of attempts to distinguish between the number of individual animals taken and the number of incidences of take, such as ability to track groups or individuals.
- Level A and Level B harassment exposures recorded by PSOs must be extrapolated based upon the number of observed takes and the percentage of respective harassment zones that are not visible.
- Marine mammal observational datasheets or raw data.

The PSOs followed the authorized harassment zones for each activity based on guidance from the March 9, 2021 issued IHA renewal.

4. OBSERVATIONS AND FINDINGS

4.1 SCHEDULE OF ACTIVITIES

The PTST Project in- water pile driving activities under the March 9, 2021issued IHA renewal was paused March 17th due to a project redesign and did not begin until June 5th, 2021 and was

concluded on November 14th, 2021 when the new IHA was issued. During this construction window, a total of 138 - 36" steel pipe piles were driven for the Interlocking Pipe Piles (IPP) for the Support Of Excavation (SOE) wall for the Portal Island No. 1 berm, 93 of which were below MHW.

In-water activities that occurred during 2021 IHA Renewal Construction Window:

During this window, all pile driving efforts were concentrated on the construction of a IPP wall on Portal Island No. 1. The installation of the 138- 36" diameter hollow steel, interlocking pipe piles were installed using a DTH hammer to get through the armor stone, then switching to an impact hammer to drive the pile to final elevation. An enclosed bubble curtain was approved by NOAA for use on the construction of the IPP wall (Figure 1). This design was a 3-sided curtain that contained the bubbles outside the parameter of the pile installation back to the armor rock. In accordance with the authorization, the bubble curtain was used during impact driving.

Figure 1: NOAA Approved Alternative Bubble Curtain for Interlocking Pipe Piles

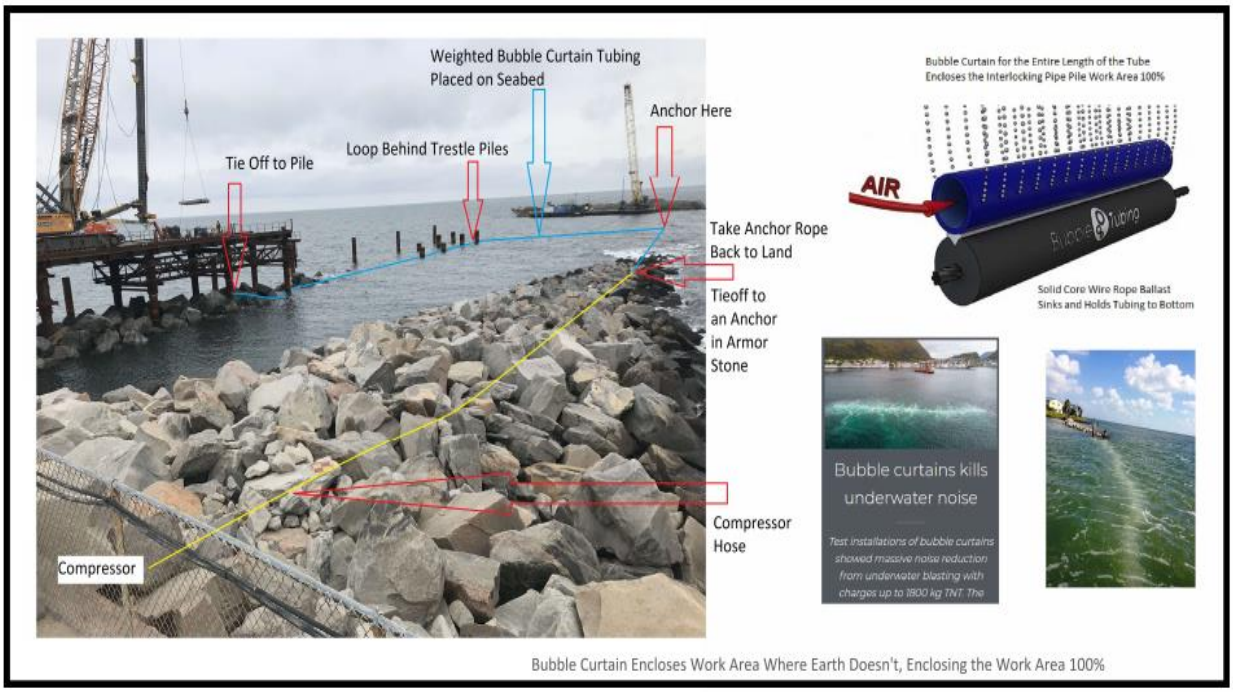

Table 3 outlines the progression of in- water pile installation throughout the March 9, 2021 IHA Renewal Construction Window.

Table 3- Pile Installation Schedule Under March 9, 2021 Issued IHA Renewal

PI#1 East IPP Drilling and Driving Log								
Pile #	**Top of Rock**	**Bottom of Bottom Layer of Rock**	**Rock Layer Thickness**	**Drilled Date**	**Initial Impact Elevation**	**Initial Impact Elevation Date**	**Impact to Final Elevation**	**Impact to Final Elevation Date**
17E	+18.50’	-6.00’	24.50’	6/5/2021	+26.55’	6/7/2021	+22.00’	7/14/2021
18E	+16.75’	-5.00’	21.75’	6/7/2021	+26.58’	6/7/2021	+22.00’	7/14/2021
19E	+16.25’	-5.50’	21.75’	6/8/2021	+26.58’	6/8/2021	+22.00’	7/14/2021
20E	+16.00’	-5.50’	21.50’	6/10/2021	+26.69’	6/10/2021	+22.00’	7/14/2021
21E	+16.75’	-4.50’	21.25’	6/10/2021	+26.52’	6/11/2021	+22.00’	7/14/2021
22E	+16.50’	-3.50’	20.00’	6/11/2021	+26.53’	6/11/2021	+22.00’	7/14/2021
23E	+15.00’	-6.50’	21.50’	6/14/2021	+26.55’	6/14/2021	+22.00’	7/14/2021
24E	+15.00’	-8.00’	23.00’	6/17/2021	+26.56’	6/18/2021	+22.00’	7/14/2021
25E	+13.00’	-9.00’	22.00’	6/18/2021	+26.58’	6/18/2021	+22.00’	7/14/2021
26E	+11.00’	-5.50’	16.50’	6/21/2021	+26.51’	6/21/2021	+22.00’	7/14/2021
27E	+12.00’	-9.00’	21.00’	6/21/2021	+26.46’	6/22/2021	+10.00’	7/14/2021
28E	+11.50’	-9.50’	21.00’	6/24/2021	+26.46’	6/24/2021	+10.00’	7/14/2021
29E	+10.00’	-8.00’	18.00’	6/25/2021	+26.51’	6/25/2021	+10.00’	7/20/2021
30E	+5.00’	-9.00’	14.00’	6/25/2021	+26.53’	6/25/2021	+10.00’	7/20/2021
31E	+6.00’	-6.25’	12.25’	6/28/2021	+26.43’	6/28/2021	+10.00’	7/20/2021
32E	+7.50’	-7.75’	15.25’	6/29/2021	+26.49’	6/29/2021	+10.00’	7/20/2021
33E	+6.00’	-7.25’	13.25’	6/29/2021	+26.45’	6/29/2021	+10.00’	7/20/2021
34E	+4.50’	-8.50’	13.00’	6/30/2021	+26.43’	7/1/2021	+10.00’	7/20/2021
35E	+2.00’	-8.50’	10.50’	7/6/2021	+26.38’	7/6/2021	+10.00’	7/20/2021
36E	+1.50’	-8.50’	10.00’	7/6/2021	+26.37’	7/6/2021	+10.00’	7/20/2021
37E	+4.50’	-3.75’	8.25’	7/7/2021	+26.32’	7/7/2021	+10.00’	7/20/2021
38E	+2.50’	-8.50’	11.00’	7/9/2021	+26.19’	7/9/2021	+10.00’	7/20/2021
39E	+2.50’	-10.50’	13.00’	7/10/2021	+26.21’	7/10/2021	+10.00’	7/20/2021
40E	+2.00’	-4.50’	06.50’	7/12/2021	+26.16’	7/12/2021	+10.20’	7/20/2021
41E*	+0.50’	-12.5’	13.00’	7/12/2021	NA	NA	+3.93’	7/21/2021
Pile #41E was cut off at elevation +3.93’								
42E	Skipped Pile – 7/12/2021							
43E	-0.75’	-15.15’	14.40’	7/24/2021	+10.51’	7/26/2021		
44E	-4.15’	-12.15’	08.00’	7/27/2021	+10.52’	7/27/2021		
45E	-3.80’	-13.95’	10.15’	7/28/2021	10.7	7/29/2021		
46E	-5.59’	-17.30’	11.71’	7/29/2021	10.61	7/29/2021		
47E	-2.69’	-15.22	12.53’	8/2/2021	+10.58’	8/3/2021		
48E	-1.56’	-14.83	13.27’	8/3/2021	+10.48’	8/3/2021		
49E	-0.80’	-23.33’	22.53’	8/5/2021	+10.49’	8/5/2021		
50E	-2.02’	-19.38’	17.36’	8/5/2021	+10.53’	8/5/2021		
51E	-0.65’	-23.97’	23.32’	8/6/2021	+10.53’	8/6/2021		
52E*	-4.03’	-24.00’	19.97’	8/6/2021	+10.46’	8/6/2021		
*Designated template was adjusted 2” South								
53E	2.43’	-21.36	23.79’	8/9/2021	+10.52’	8/9/2021		
54E	-6.89’	-24.48’	17.59’	8/10/2021	+10.54’	8/10/2021		
55E	0.56’	-21.75’	21.19’	8/13/2021	+10.60’	8/16/2021		
56E	-0.85’	-28.76’	27.91’	8/17/2021	+10.69’	8/17/2021		
57E	-0.65’	-23.47’	22.82’	8/18/2021	+10.67’	8/18/2021		

58E	-1.08’	-26.97’	25.89’	8/18/2021	+10.66’	8/18/2021		
59E	Skipped Pile - 8/19/2021							
60E	-4.28’	-23.02’	18.04’	8/19/2021	+10.57’	8/19/2021		
61E	-3.64’	-29.57’	25.93’	8/20/2021	+10.00’	8/20/2021		
62E	+0.50’	-20.73’	21.23’	8/21/2021	+10.00’	8/21/2021		
63E	-8.91’	-21.00’	12.09’	8/21/2021	+10.00’	8/21/2021		
64E	-4.84’	-18.90’	14.06’	8/23/2021	+10.00’	8/23/2021		
65E	-3.25’	-19.52’	16.27’	8/24/2021	+10.00’	8/24/2021		
66E	-4.50’	-23.18’	18.68’	8/24/2021	+10.00’	8/24/2021		
67E	-7.93’	-24.25’	16.32’	8/24/2021	+10.00’	8/24/2021		
68E	-0.85’	-24.08’	23.23’	8/25/2021	+10.00’	8/25/2021		
69E	-4.62’	-23.00’	18.38’	8/25/2021	+10.00’	8/25/2021		
70E	-4.60’	-23.80’	19.20’	8/26/2021	+10.00’	8/26/2021		
71E	-6.88’	-24.05’	17.17’	8/26/2021	+10.00’	8/26/2021		
72E	-1.54’	-19.46’	17.92’	8/27/2021	+10.00’	8/27/2021		
73E	-4.58’	-25.58’	21.00’	8/27/2021	+10.00’	8/27/2021		
74E	-2.94’	-24.01’	21.07’	8/27/2021	+10.00’	8/27/2021		
75E	-5.45’	-19.50’	14.05’	8/30/2021	+10.00’	8/30/2021		
76E	-2.30’	-22.36’	20.06’	8/31/2021	+10.00’	8/31/2021		
77E	-3.33’	-27.5’	24.17’	9/1/2021	+10.00’	9/1/2021		
78E	Skipped Pile – 9/3/2021							
79E	-6.75’	-21.28’	14.53’	9/3/2021	+10.00’	9/3/2021		
80E	-2.72’	-43.51’	40.79	9/7/2021	+10.00’	9/7/2021		
81E	-2	-41.60’	39.60’	9/7/2021	+10.00’	9/8/2021		
82E	-4.01’	-33.43’	29.42’	9/8/2021	+10.00’	9/8/2021		
83E	-1.91’	-31.17’	29.26’	9/8/2021	+10.00’	9/9/2021		
84E	-5.86’	-37.95’	32.09’	9/10/2021	+10.00’	9/10/2021		
85E	-3.50’	-28.24’	24.74’	9/13/2021	+10.00’	9/13/2021		
86E	-5.52’	-35.15’	29.63’	9/13/2021	+10.00’	9/13/2021		
87E	-0.30’	-37.80’	37.5’	9/14/2021	+10.00’	9/14/2021		
88E	-1.88’	-39.3’	37.42’	9/15/2021	+10.00’	9/15/2021		
89E	-3.91’	-36.53’	32.62’	9/15/2021	+10.00’	9/15/2021		
90E	-2.37’	-34.90’	32.53’	9/16/2021	+10.52’	9/16/2021		
91E	-7.14’	-35.44’	28.30’	9/17/2021	+10.55’	9/17/2021		
92E	-8.78	-35.40’	26.62’	9/21/2021	+10.42’	9/22/2021		
93E	-7.3	-34.24	26.94	9/27/2021	+10.44’	9/30/2021		
94E	-11.15	-34.13	22.98’	10/1/2021	+10.45’	10/1/2021		
95E	-10.94’	-31.04’	20.1’	10/4/2021	+10.48’	10/4/2021		
96E	-7.14’	-29.29’	22.15’	10/5/2021	+10.48’	10/5/2021		
97E	-1.67’	-27.31’	25.64	10/6/2021	+10.45’	10/6/2021		
98E	-8.78’	-31.19’	22.41’	10/7/2021	+10.39’	10/7/2021		
99E	-8.26’	-34.74’	26.48’	10/12/2021	+10.00’	10/12/2021		
100E	-7.03’	-33.46’	26.43’	10/12/2021	+10.00’	10/12/2021		
101E	-9.87	-31.07	21.2’	10/13/2021	+10.00’	10/13/2021		
102E	-8.98	-32.76	23.78’	10/14/2021	10	10/14/2021		
103E	-9.6	-32.95	23.35’	10/15/2021	10	10/15/2021		
104E	-12.71	-34.12	21.41’	10/19/2021	10	10/19/2021		
105E	-14.78	-33.02	18.24’	10/20/2021	10	10/20/2021		

106E	-13.18	-28.88	15.7’	10/21/2021	10.79	10/21/2021		
107E	-15.99’	-32.86’	16.87’	10/22/2021	10.76	10/22/2021		
108E	-6.3’	-33.53’	27.23’	10/29/2021	10.81	10/29/2021		
109E	-8.34’	-29.3’	20.96’	10/29/2021	10.75	10/29/2021		
110E	-10.09	-32.8	22.71’	10/30/2021	10.9	10/30/2021		
111E	-15.1	-34.47	19.37’	11/1/2021	10	11/1/2021		
112E	-11.75	-29.91	18.16’	11/2/2021	10	11/2/2021		
113E	-11.26	-31.05	19.79’	11/2/2021	10	11/3/2021		
114E	-13.97	-33.21	19.24’	11/9/2021	10	11/9/2021		
115E	-16.15	-33.05	16.9’	11/10/2021	10	11/10/2021		
116E	-14.04	-33.32	19.28’	11/10/2021	10	11/10/2021		
117E	-15.35	-33.87	18.52’	11/11/2021	10	11/11/2021		
118E	-16.65	-32.39	15.74’	11/16/2021	10	11/16/2021		
119E	-17.67	-34.16	16.49’	11/16/2021				

Empty cells indicate that pile has not been driven to final grade

PI#1 West IPP Drilling and Driving Log

Pile #	Top of Rock	Bottom of Bottom Layer of Rock	Rock Layer Thickness	Drilled Date	Initial Impact Elevation	Initial Impact Elevation Date	Impact to Final Elevation	Impact to Final Elevation Date
1W	+19’	+9’	10’	10/22/2019	31.86’			
2W	+20’	+10’	10’	10/28/2019	22.68’	5/26/2021		
3W	+18’	-7’	25’	10/31/2019	22.64’	5/27/2020		
4W	+18’	+12’	6’	11/26/2019	22.56’	5/27/2020		
5W	+18’	0	18’	3/4/2020	22.47’	5/26/2020		
6W	+15’	+1’	16’	3/6/2020	22.4’	5/26/2020		
7W	+18’	0	18’	3/11/2020	22.25’	5/26/2020		
8W	+17.83’	0	17.8’	03/12/020	22.2’	5/26/2020		
9W	+13.75’	0	13.8’	3/13/2020	31.68’	5/26/2020		
10W	+17.96’	-8.85’	26.81’	9/28/2021				
11W	+18.3’	-1.78’	20.03’	9/29/2021	31.86’	9/29/2021		
12W	15.87	-6.78	22.65’	9/30/2021	31.86’	9/30/2021		
13W	14.96	-7.11	22.07’	9/30/2021	31.86’	10/1/2021		
14W	15.78	-7.66	23.44’	10/1/2021	31.86’	10/1/2021		
15W	12.07	-7.79	19.86’	10/1/2021	31.52’	10/4/2021		
16W	12.12	-11.94	24.06’	10/5/2021	31.58’	10/5/2021		
17W	19.69	-6.96	26.65’	10/6/2021	31.56’	10/6/2021		
18W	18.71	-9.86	28.57’	10/6/2021	31.56’	10/6/2021		
19W	11.88	-9.18	21.06’	10/7/2021	31.59’	10/8/2021		
20W	14.35	-10.19	24.54’	10/8/2021	31.86’	10/8/2021		
21W	12.15	-12.15	24.3’	10/12/2021	31.86’	10/12/2021		

165W	20.11	2.8	17.31’	10/13/2021	31.86’	10/13/2021		
164W	20.55	9.05	11.5’	10/14/2021	31.86’	10/15/2021		
163W	18.6	8.81	9.81’	10/15/2021	31.86’	10/15/2021		
162W	19.29	6.95	12.34’	10/15/2021	31.86’	10/15/2021		
22W	8.7	-7.18	15.88’	10/19/2021	31.86’	10/19/2021		
23W	7.24	0.34	6.9’	10/20/2021	31.86’	10/20/2021		
24W	7.13	-7.45	14.58’	10/20/2021	31.86’	10/20/2021		
25W	9.02	-17.26	26.28’	10/21/2021	27.30’	10/21/2021		
Skipped 26W								
27W	+7.26’	-9.14’	16.4’	10/27/2021	26.30’	10/28/2021		
28W	+4.3’	-11.67	7.37’	10/28/2021	25.99’	10/28/2021		
29W	7.3	-10.97	18.27’	11/1/2021	31.86’	11/1/2021		
30W	2.52	-9.85	12.37’	11/2/2021	31.86’	11/2/2021		
31W	4.37	-10.47	14.84’	11/2/2021	31.86’	11/3/2021		
32W	4.52	-6.46	10.98’	11/3/2021	31.86’	11/3/2021		
33W	6.58	-13.75	20.33’	11/4/2021	31.86’	11/4/2021		
34W	4.36	-12.56	16.92’	11/4/2021	31.86’	11/4/2021		
35W	4.55	-12.49	17.04	11/8/2021	31.86’	11/8/2021		
36W	4.06	-13.26	17.32’	11/8/2021	31.86’	11/9/2021		
37W	-0.13	-12.33	12.20’	11/9/2021	31.86’	11/9/2021		
38W	8.36	-16.75	25.11’	11/10/2021	31.86’	11/10/2021		
39W	-1.21	-16.87	15.66’	11/11/2021	31.86’	11/11/2021		
40W	7.61	-17.91	25.52’	11/16/2021	31.86’	11/16/2021		

Empty cells indicate that pile has not been driven to final grade

A detailed description of the construction activities for which takes were authorized may be found in the Federal Register notice of proposed IHA renewal for the 2021 authorization (86 FR 14606; March 10, 2021). The location, timing (e.g., seasonality), and nature of the pile driving operations, including the type and size of piles and the methods of driving, analyzed in the 2021 IHA Renewal Request are identical to those analyzed in the previous 2020 issued IHA.

4.2 Marine Species Observed in the Project Area

In-water pile driving construction under this IHA renewal was performed from March 9-17th, when production was halted due to unforeseen geological conditions that required a redesign. Pile driving resumed only on Island 1 on June 5th until November 16th, when CTJV received the new IHA . In that time, 101 days were spent driving in- water piles (below MHW). Of those days PSOs were onsite 142 days to observe both upland and in-water pile installation. There were a

total of 829 marine mammals observed in this time period. 823 of the sightings were of bottlenose dolphins, with the possibility of 103 of those sightings being duplicates of already observed individual dolphins, and 6 harbor seal sightings. Of these sightings, 2 Level A harassments for harbor seals were recorded and 12 Level B harassments occurred for bottlenose dolphins.

Table 4 details the marine mammal sighting that occurred during the March 9, 2021 issued IHA renewal. Observed marine mammal log can be found in Appendix B.

Table 4- Observed Mammals During Pile Driving Activities Under March 2021 Issued IHA

Species	Species Observed March 9, 2021- November 16, 2021
Humpback Whale	0
Harbor Porpise	0
Bottlenose Dolphin	823
Harbor Seal	6
Gray Seal	0

Table 5 indicates how many Level A and B Harassments were authorized and actually occurred by species and stock

Table 5- Level A and Level B Harassment, By Species and Stock

Species	Stock	Level A Takes Allowed in 2021 IHA Renewal	Level B Takes Allowed in 2021 IHA Renewal	Level A Takes to Occur Under 2021 IHA Renewal	Level B Takes to Occur Under 2021 IHA Renewal
Humpback Whale	Gulf of Maine	-	12	-	-

Harbor Porpise	Gulf of Maine/ Bay of Fundy	5	7	-	-
Bottlenose Dolphin	WNA Coastal, Northern Migratory	142	14,095	-	6
	WNA Coastal, Southern Migratory	142	14,095	-	6
	NNCES	2	198	-	-
Harbor Seal	Western North Atlantic	1,296	2,124	2	-
Gray Seal	Western North Atlantic	1	3	-	-

5. MITIGATION MEASURES

5.1 GENERAL CONSTRUCTION MITIGATION

The Project followed the guidance of NOAA's March 9, 2021 issued IHA Mitigation Measures. These measures include:

- For in-water construction heavy machinery activities other than pile driving (*e.g.*, use of barge-mounted excavators, or dredging), if a marine mammal comes within 10 m, CTJV must cease operations and reduce vessel speed to the minimum level required to maintain steerage and safe working conditions.

- CTJV is required to conduct briefings for construction supervisors and crews, the monitoring team, and CTJV staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.

- CTJV is required to employ between two and four MMOs per the activity as outlined in the issued March 9, 2021 IHA renewal.

- Marine mammal monitoring must take place from 30 minutes prior to initiation of pile driving activity through 30 minutes post-completion of pile driving activity. Pre-activity monitoring must be conducted for 30 minutes to ensure that the shutdown zone is clear of marine mammals, and pile driving may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, animals shall be allowed to remain in the shutdown zone (*i.e.*, must leave of their own volition) and their behavior shall be monitored and documented.

CTJV must establish shutdown zones at the following distances:

i. 100 meters for harbor porpoise and bottlenose dolphin.

ii. 15 meters for harbor seal and gray seal.

iii. For humpback whales isopleths in low-frequency cetaceans, depending on activity type, has a shutdown zone between 90- 2,920 meters (as depicted in Table 2).

- If a marine mammal enters or is observed within an established shutdown zone pile driving must be halted or delayed. Pile driving may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without subsequent detections of the animal.

- Should environmental conditions deteriorate such that marine mammals within the entire shutdown zone would not be visible (e.g., fog, heavy rain), pile driving and removal must be delayed until the MMO(s) is confident marine mammals within the shutdown zone could be detected.

- CTJV must use soft start techniques when impact pile driving. Soft start requires contractors to provide an initial set of strikes at reduced energy, followed by a thirty-second waiting period, then two subsequent reduced energy strike sets. 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.

- CTJV must use an air bubble curtain system during impact pile driving of steel pipe piles. Bubble curtains must meet the following requirements:

  i. The bubble curtain must distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column.

  ii. The lowest bubble ring must be in contact with the mudline and/or rock bottom for the full circumference of the ring, and the weights attached to the bottom ring shall ensure 100 percent mudline and/or rock bottom contact. No parts of the ring or other objects shall prevent full mudline and/or rock bottom contact.

  iii. The bubble curtain must be operated such that there is proper (equal) balancing of air flow to all bubblers.

iv. CTJV must employ the bubble curtain during impact pile driving of all steel piles in water depths greater than 3 m (10 ft.).

- CTJV must establish Level A harassment and B harassment monitoring zones as.

If a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized takes are met, is observed entering or within the monitoring zones outlined in the March 9, 2021 IHA renewal, pile driving activities must shut down immediately using delay and shutdown procedures. Activities must not resume until the animal has been confirmed to have left the area on their own or the 15-minute observation time period has elapsed.

Level A and Level B harassment exposures recorded by PSOs must be extrapolated based upon the number of observed takes and the percentage of respective harassment zones that are not visible. If the entire Level B monitoring zone is not visible, pile driving activities may continue, and the number of individual animals within the Level B zone will be estimated and recorded. Estimated numbers of individuals will be extrapolated by dividing the number of observed individuals by the percentage of the monitoring zone that was visible.

APPENDIX A-

Marine Mammal Monitoring Plan

Marine Mammal Monitoring Plan
for the
Parallel Thimble Shoal Tunnel Project

Prepared by:

Chesapeake Tunnel Joint Venture
2377 Ferry Road
Virginia Beach, Virginia 23455

Submitted to:

National Marine Fisheries Service
Office of Protected Resources
1315 East-West Highway
Silver Spring, Maryland 20910-3226

March 2020

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ACRONYMS AND ABBREVIATIONS

CT JV	Chesapeake Tunnel Joint Venture
DTH	Down the Hole
ft	feet
GPS	Global Positioning System

IHA	Incidental Harassment Authorization
MHW	Mean High Water
MLW	Mean Low Water
MMMP	Marine Mammal Monitoring Plan
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	National Marine Fisheries Service
Nos.	Numbers
PTS	Permanent Threshold Shift
PTST	Parallel Thimble Shoal Tunnel
SOE	Support of Excavation
TBM	Tunnel boring machine
ZOI	Zone of impact

1. INTRODUCTION

The Parallel Thimble Shoal Tunnel (PTST) Project consists of the construction of a two-lane parallel tunnel to the west of the existing Thimble Shoal Tunnel, connecting Portal Island Numbers (Nos.) 1 and 2 (Figure 1). Upon completion, the new tunnel will carry two lanes of southbound traffic and the existing tunnel will remain in operation and carry two lanes of northbound traffic. The 6,525 linear feet (ft) of new tunnel will be constructed using a tunnel boring machine (TBM), with 5,356 linear ft located below Mean High Water (MHW).

Pile driving during construction of the PTST Project has the potential to cause sound levels that exceed Level A and Level B acoustic harassment thresholds for marine mammals as defined by the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NOAA Fisheries) Office of Protected Resources (NOAA Fisheries 2016).

During a 12-month construction period extending from September 2019 through August 2020 (Table 1), up to 130 hollow steel piles measuring 36 inches in diameter will be installed to support a temporary dock at Portal Island No. 1. Of these, 64 will be placed in-water and 47 will be placed upland (above the Mean High Water [MHW] line). Up to 30 hollow steel piles (36-inch diameter) will be installed to provide mooring facilities on the west side of the portal islands (a total of 6 dolphin moorings comprised of 5 piles each).

Construction will also include two temporary Omega trestles, each with 28 in-water and 8 upland piles, for a total of 36, 36-inch hollow steel pipe piles offset to the west side of each engineered berm and extending channelward from Portal Island Nos. 1 and 2, respectively. In-water pile driving activities, will also include installation of o-piles for berm Support of Excavation (SOE) walls at each portal island. Up to a total of 488 36-inch diameter hollow steel interlocked piles will be installed in-water for the SOE walls. There will also be driving of landside sheet pile on Portal Island No. 1 to construct the holding bins (muck bin) for excavated tunnel material and to support tunnel excavation activities.

Table 1. Authorized Amount of Taking, by Level A Harassment and Level B Harassment, by species and stock

Species	Stock	Level A Takes	Level B Takes
Humpback whale	Gulf of Maine	--	12
Harbor porpoise	Gulf of Maine/Bay of Fundy	5	7
Bottlenose dolphin	WNA Coastal, Northern Migratory	142	14,095
	WNA Coastal, Southern Migratory	142	14,095
	NNCES	2	198
Harbor seal	Western North Atlantic	1,296	2,124
Gray seal	Western North Atlantic	1	3

The Chesapeake Tunnel Joint Venture (CTJV) has submitted an Incidental Harassment Authorization (IHA) application to request takes for four species: harbor seals (*Phoca vitulina*), gray seals (*Halichoerus grypus*), bottlenose dolphin (*Tursiops* spp.), and humpback whales (*Megaptera novaeangliae*) by Level B harassment. Fin whales (*Balaenoptera physalus*), North Atlantic right whales (*Eubalaena glacialis*), and harbor porpoise (*Phocoena phocoena*) are expected to be rare in the PTST Project Area, and no takes have been requested for these species. Pile and sheet pile driving operations will cease if any marine mammal species enters the Level A Shutdown Zones (Section 3) or if fin whales, humpback whales, North Atlantic right whales, and harbor porpoise are observed in the level B monitoring zones (Section 3). No takes are requested for airborne noise associated with on-land pile driving. Prior to the issuance of the IHA, pile driving on Portal Islands will cease if gray or harbor seals are observed entering the Level B airborne noise monitoring zone associated with these activities. Takes requested are summarized in Table 2.

Table 2. Level A and B Harrassment Monitoring Zones During Project Activities (meters)

Scenario		Level A Harassment Zones				Level B Monitoring Zones
		Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	
Driving Type	Pile Type	Island 1 & 2	Island 1 & 2	Island 1 & 2	Island 1 & 2	Island 1 & 2
Impact	12-in. Timber	90	--	105	--	25
	36-in. Steel	2,920	105	3,480	1,565	1,585
Impact with Bubble Curtain	36-in. Steel	1,000	--	1,190	535	545
DTH – Impulsive	42-in. Steel	970	--	1,155	520	215
DTH Simultaneous at same island	42-in. Steel	1,535	--	1,830	825	215
DTH & Impact Hammer with bubble curtain: Simultaneous at the same island	36-and 42-in. Steel	1,970	--	2,400	1,055	545

DTH at PI 1. And Impact with Bubble Curtain Hammer at PI 2	36-and 42-in. Steel	970	--	1,155	520	215 from PI 1 545 from PI 2
Continuous (Vibratory)	12-in. Timber	--	--	--	--	1,360
	36-in. Steel	20	--	--	--	21,545
	42-in.** Steel	20	--	--	--	21,545

-- indicates that shutdown zone is larger than calculated harassment zone.
**Activity only planned at Portal Island 1 as part of project pile driving plan.

Level A Shutdown Zones and B Zones of Impact (ZOI) are calculated based on the type of activity occurring and the hearing frequency of the marine mammal. Animals that may inhabit or pass through the area of construction are classified within the following hearing frequencies:

<u>High Frequency Cetacean:</u>

- Harbor Porpoise (*Phocoena phocoena*)

<u>Mid-Frequency Cetacean:</u>

- Bottlenose Dolphins (*Tursiops spp.*)

<u>Low Frequency Cetacean:</u>

- Baleen Whales:
    - Fin Whale (*Balaenoptera physalus*)
    - Humpback Whale (*Megaptera novaeangliae*)
    - North Atlantic Right Whale (*Eubalaena glacialis*)

<u>Phocid Pinnipeds:</u>

- Harbor Seals (*Phoca vitulina*)
- Gray Seals (*Halichoerus grypus*)

This PTST Marine Mammal Monitoring Plan (MMMP) proposes a protocol for monitoring marine mammals during round pile and sheet pile driving activities in the Project Area. The goal of this MMMP is to prevent unauthorized Level A or Level B takes and to minimize Level B harassment using clearly defined methods for monitoring and shutdown procedures during construction. Incidents of harassment and construction shutdown events will be recorded and reported.

2. METHODS

2.1 MONITORING PROCEDURES

The CTJV, the design-build contractor for the PTST Project, proposes the following MMMP procedures:

- Use of marine mammal observers during pile and sheet pile driving activities. Observers will meet the criteria defined in Section 2.2.

- Monitoring distances, in accordance with the Level A Shutdown Zone and Level B ZOI identified in Section 3, will be determined by using a range finder, scope, hand-held global positioning system (GPS) device or landmarks with known distances from the monitoring positions. Monitoring locations will be based on land at either Portal Island No. 1 or Portal Island No. 2.

- If the entire Level B monitoring zone is not visible, pile driving activities may continue, and the number of individual listed animals within the Level B zone will be estimated and recorded. Estimated numbers of individuals will be extrapolated by dividing the number of observed individuals by the percentage of the monitoring zone that was visible.

- Zones will be monitored for the presence of marine mammals 30 minutes before, during, and 30 minutes after any pile driving activity. Observers will scan the waters within the area of potential sound effects using binoculars (10X42 or similar) or spotting scopes (20-60 zoom or equivalent), and make visual observations.

- Monitoring will be continuous unless the contractor takes a break longer than 2 hours from active pile and sheet pile driving, in which case, monitoring will be required 30 minutes prior to restarting pile installation.

- If marine mammals are observed, their location within the zones, and their reaction (if any) to pile activities will be documented.

- If a marine mammal crosses into the designated ZOIs for that species, additional monitoring or a temporary stop to pile driving activity will occur, in accordance with the procedures outlined in Section 5 of this Monitoring Plan.

- If weather or sea conditions restrict the observer's ability to observe, or become unsafe, pile installation will be suspended until conditions allow for monitoring to resume.

- For in-water pile driving, under conditions of fog or poor visibility that might obscure the presence of a marine mammal within the shutdown zone, the pile in progress will be completed and then pile driving suspended until visibility conditions improve. Visibility will be confirmed and approved by the MMO at the beginning of the shift. Likewise, the certified MMO will determine the number of observers needed to cover the ZOI based on

the visibility conditions anticipated for the following shift and their best professional judgement call.

Monitoring will occur year-round, during pile driving operations, because some marine mammal species have the potential to be present at any time of the year.

2.2 OBSERVER QUALIFICATIONS

The CTJV will employ NOAA Fisheries-approved marine mammal observers to monitor Level A Shutdown Zones and Level B ZOI. These individuals will be independent (i.e., not construction personnel) trained biologists with:

- Visual acuity in both eyes sufficient to see moving objects on the water's surface; ability to estimate object size and distance.
- The ability to make visual field observations and collect data as described in the protocol.
- Experience or training with identifying marine mammals in the field.
- Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations.
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- The ability to prepare a status report of monitoring activities that describes the species and number of individuals observed, dates and times of construction activities; dates of when construction activities were ceased or shutdown to avoid Level A harassment to any species or Level B harassment for any species for that the PTST Project is not authorized to take.

If only one marine mammal observer is needed, this individual will have prior experience with observing marine mammals in the field. If teams of two or more observers are needed, one observer will be designated as the lead observer. The lead observer will have prior experience working as a marine mammal observer, and additional observers may substitute education or training for experience.

2.3 DATA COLLECTION

Marine mammal observers at the PTST Project Area will use Observation Record Forms approved by NOAA. An observation record will be completed by each observer for each location and day of survey.

The following data will be included in the observation records:

- Date and time that in-water or upland round pile or sheet pile driving/installation begins and/or ends;

- Sea state using the Beaufort Wind Force Scale and weather including percent cloud cover, percent glare, visibility;

- Species, numbers of individuals, and when possible the sex and age class of observed marine mammals;

- Pile driving or sheet pile activities occurring during each sighting;

- Behaviors exhibited by observed marine mammals, including bearing and direction of travel, and behavioral responses to soft-start and shutdown procedures;

- Location of marine mammal, distance from observer to marine mammal, and distance from the pile driving activities to the marine mammal.

- Whether the observation required implementation of shutdown procedures and the duration of each shutdown;

- Other human activity in the area such as fishing or transit of navy or cargo ships in the navigation channel. Hull numbers of fishing, cargo, or navy vessels will be recorded if possible.

2.4 EQUIPMENT

Marine mammal observers will have the following equipment available during monitoring:

- Binoculars
- Range finder
- Logbook
- Cell phone or other wireless communication
- GPS Unit (for all vessel based observations, if implemented).

3. LEVEL A AND LEVEL B MONITORING ZONES

Impact hammer and Down-the-hole (DTH) drill will be used to install hollow steel and king piles. Above Mean High Water, sheet piles will be installed using a vibratory and impact hammer. No airborne sound data were available for impact driving of King Piles and Sheet Piles to determine in-air Level B monitoring zones and therefore, the Level B ZOI for impact driving of the hollow steel pile should be followed during such activity. The Level B ZOI will remain constant in size through the daily pile driving activities. The Level A Shutdown Zones will depend on the duration of pile driving activity and the presence of marine mammals per 24-hour period. For impact driving, up to 3 piles will be driven per 24-hour period using the following adaptive monitoring approach: Monitoring will begin each day using the 3-hour (i.e., 3-pile) Level A Shutdown Zone. If after the first pile is driven, no marine mammals have been observed in the Level A Shutdown Zone, then the Level A Shutdown Zone will reduce to the 2-hour Zone.

If no marine mammals are observed within the 2-hour Level A Shutdown Zone during the driving of the second pile, then the Level A Shutdown Zone will reduce to the 1-hour Zone. However, if a mammal is observed entering the 3-hour Level A Shutdown Zone during the driving of the first pile, then the 3-hour Level A Shutdown Zone will be monitored for the remainder of pile driving activities for that day. Likewise, if a marine mammal is observed within the 2-hour Shutdown Zone, then the 3-hour Level A Shutdown Zone will be monitored for the remainder of pile driving activities for that day.

The monitoring zone sizes for Level A (shutdown) depend on the number of piles to be driven each day and whether simultaneous pile driving will occur. For this Project, simultaneous pile driving refers to one hammer operating on each Portal Island or two hammers operating on the same island.

4. OBSERVER LOCATIONS

Marine mammal observers will be located on Portal Island Nos. 1 and 2.

5. RESPONSE TO OBSERVED MARINE MAMMALS

5.1 OBSERVATIONS OF HEALTHY MARINE MAMMALS

If a whale or harbor porpoise is observed entering the Level A or Level B monitoring zones, the observer will directly contact the construction supervisor to indicate that pile driving needs to be stopped immediately. The observer will track the individual until it has left the Level A Shutdown Zone. After the whale or porpoise has been out of the Level A Shutdown Zone and B monitoring zones for 30 minutes, the observer will notify the construction supervisor that pile driving activities may resume.

If a seal or bottlenose dolphin enters the Level A Shutdown Zones, the observer will directly contact the construction supervisor to indicate that pile driving needs to be stopped immediately. The observer(s) tracks the individual until it has left the Level A Shutdown Zone. After the seal or dolphin has been out of the Level A Shutdown Zone for 30 minutes, the observer will notify the construction supervisor that pile driving activities may resume.

If a seal or bottlenose dolphin enters the Level B monitoring zone for in-water activities, the observer will record a take of the species observed. Each individual marine mammal will count once as a take in a 24-hour period. If a seal enters the Level B monitoring zone for in water or in-air pile driving activities the observer will record a take of the species observed. If the seal hauls out it or is recorded hauled out it is not recorded again in the reciprocal environment. The observer(s) will track the individual until it has left the Level B monitoring zone.

All observations and takes of marine mammals will be documented on observation forms and compiled records will be reported to NOAA in accordance with the reporting procedures described in Section 6.

5.2 OBSERVATIONS OF INJURED OR DEAD MARINE MAMMALS

If dead or dying marine mammals are observed in the monitoring zones, regardless of known cause, the observer(s) will:

- Record the species type (if known), date, time, and location of the observation,
- Take a photograph of the specimen, and
- Immediately notify NOAA Fisheries.

5.3 UNAUTHORIZED EXPOSURES

If an unauthorized exposure occurs (e.g., a marine mammal occurring in a Level A Shutdown Zone or Level B ZOI without an authorized take), the observer(s) will:

- Record the species type (if known), date, time, and location of the observation,
- Record any behavioral changes that occur during observation,
- Contact the construction manager to cease pile driving activity immediately, and
- Immediately notify NOAA Fisheries.

6. REPORTING

An annual report will be prepared and distributed to NOAA Fisheries once per calendar year that pile or sheet pile driving occurs. The report will be provided to NOAA Fisheries by December 31 of each year where a report is needed. This annual report will include an executive summary, monitoring methodology, tabulation of marine mammal observations (including number, type, and location of observations), dates and times when monitoring occurred, and pile driving was completed, and dates and times when in-water construction was suspended because of marine mammals.

7. REFERENCES

NOAA. 2016. Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. Technical Memorandum NMFS-OPR-55.

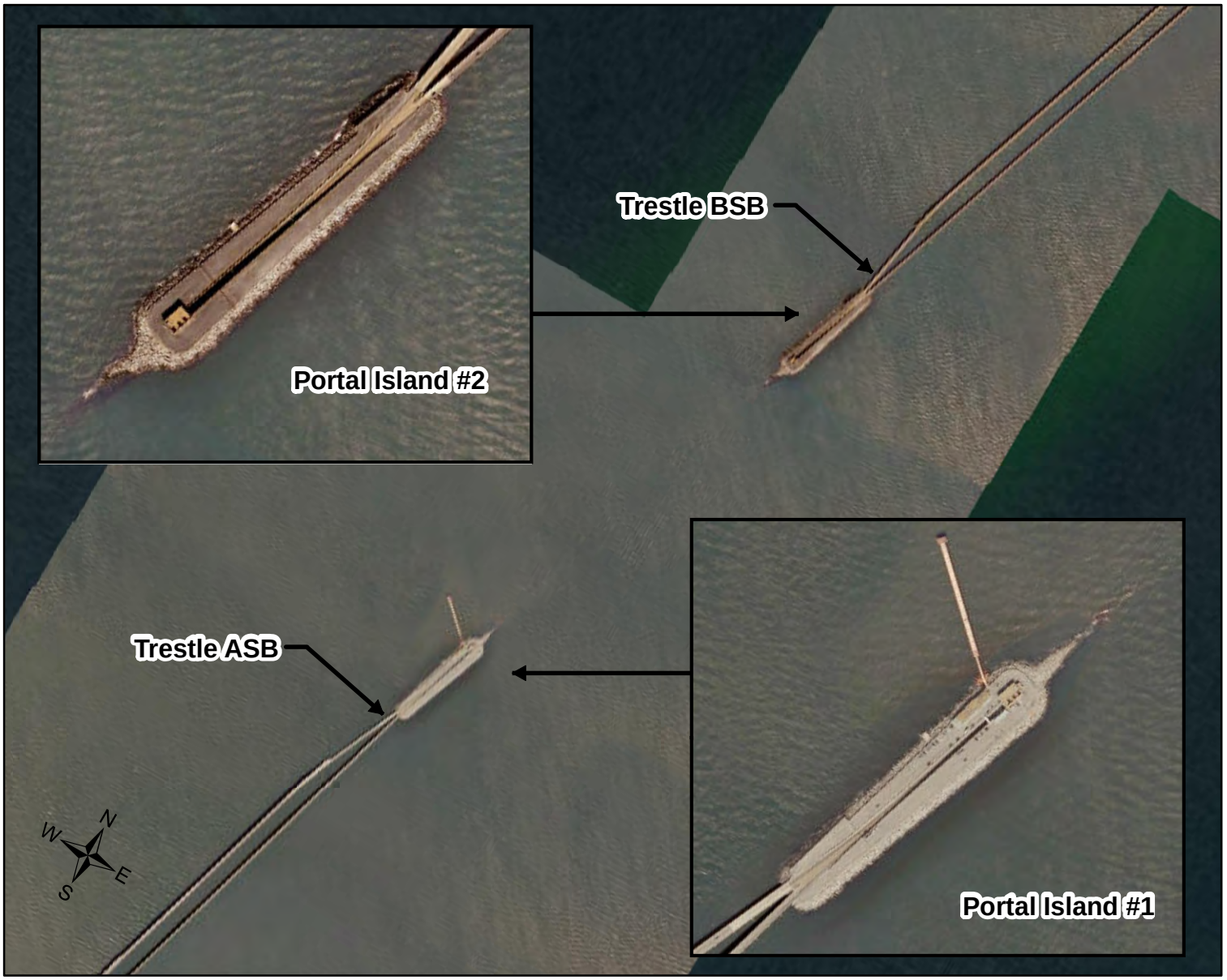


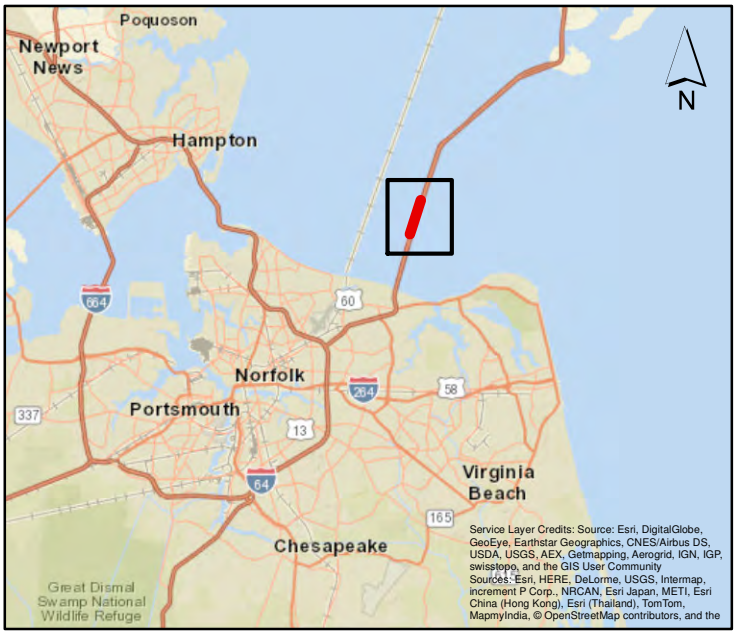
Figure 1. Project Location Map
Chesapeake Bay Bridge and Tunnel District
Thimble Shoal Parallel Tunnel

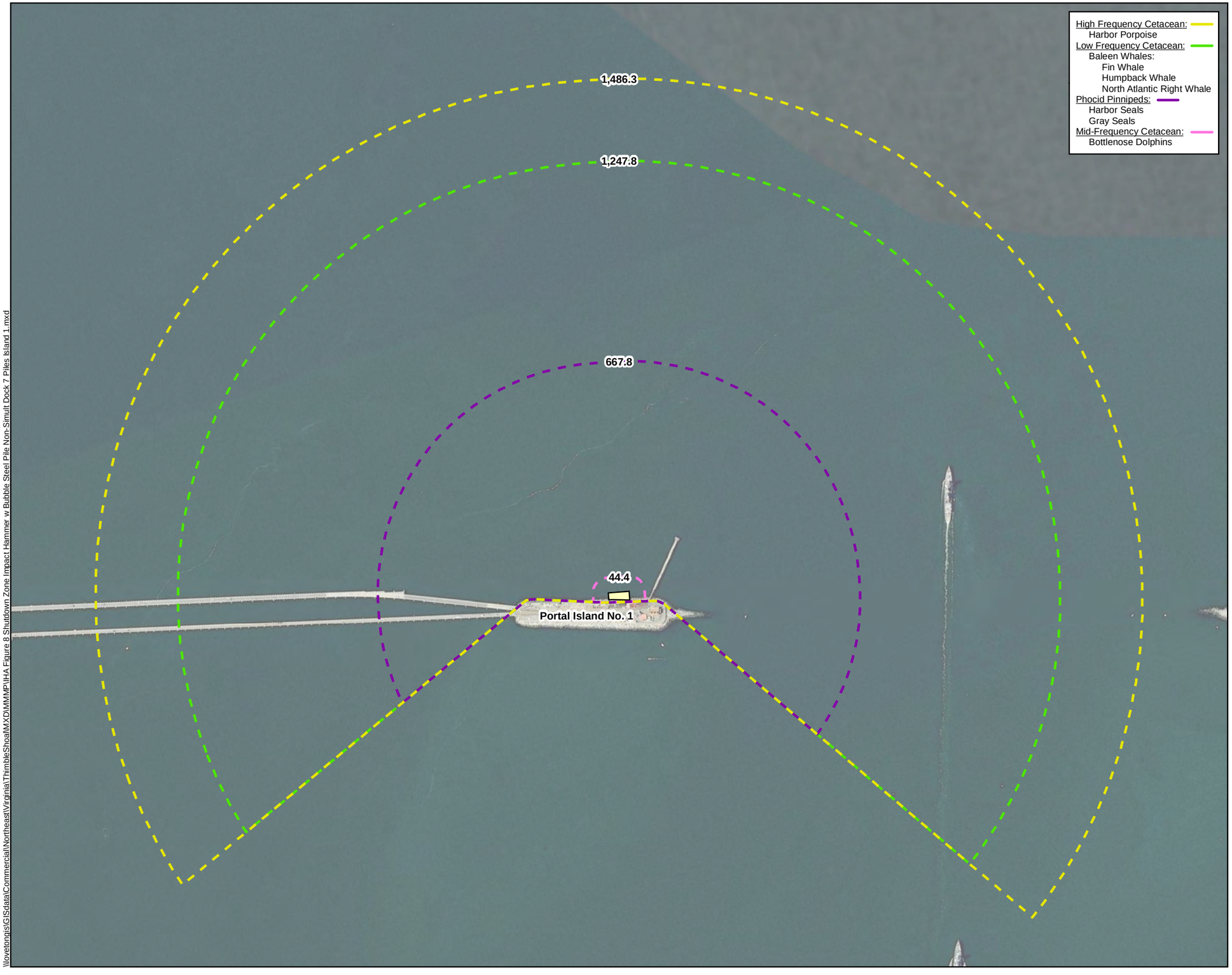
CHESAPEAKE TUNNEL JV

CHESAPEAKE BAY BRIDGE-TUNNEL

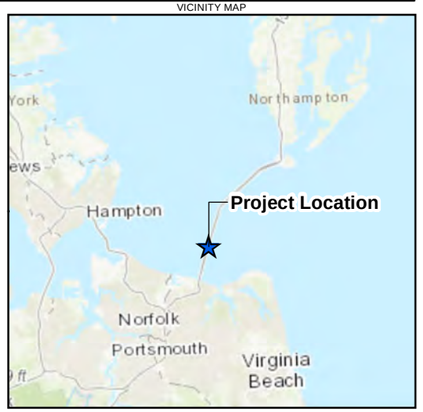
MOTT MACDONALD

0 0.5 1 Miles





VICINITY MAP



Legend

Temporary Dock

7 Impact Piles per Day - Shutdown Zone

- 1,486.3 m - High-Frequency Cetaceans
- 1,247.8 m - Low-Frequency Cetaceans
- 667.8 m - Phocid Pinnipeds
- 44.4 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2018, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 200 400
Meters

N

CHESAPEAKE TUNNEL JV

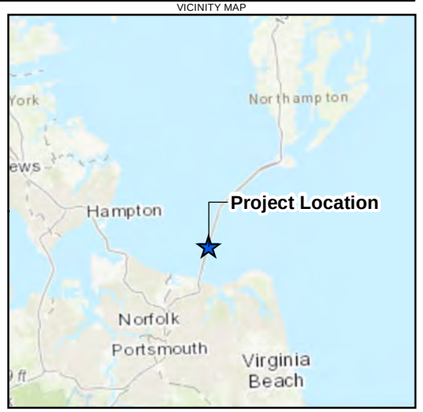
EA

MOTT MACDONALD

Figure 1
Distance (meters) to Shutdown Zone Using an Impact Hammer with Bubble Curtain for Non-Simultaneous 36- and 42-in Steel Pile Driving for the Temporary Dock – 7 Piles per Day at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMP\IHA Figure 8 Shutdown Zone Impact Hammer w Bubble Steel Pile Non-Simult Dock 7 Piles Island 1.mxd

VICINITY MAP



Legend

⊗ Mooring Dolphin

10 Vibratory Piles per Day - Shutdown Zone

- 7.4 m - High-Frequency Cetaceans
- 5.0 m - Low-Frequency Cetaceans
- 3.0 m - Phocid Pinnipeds
- 0.4 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2018, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 100 200
Meters

N

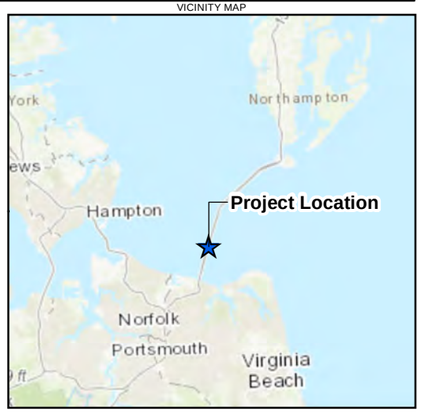
CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 2
Distance (meters) to Shutdown Zone Using a Vibratory Hammer for Non-Simultaneous Timber Pile Driving for the Mooring Dolphins – 10 Piles per Day at Portal Island Nos. 1 and 2
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetonnis\GISdata\Commercial\Northeast\VirginiaThimbleShoal\MXD\MMPI\HA Figure 9 Shutdown Zone Vibratory Hammer Timber Pile Non-Simult Mooring Dolphins 10 Piles Island 1 and 2.mxd

VICINITY MAP



Legend

Temporary Dock

10 Vibratory Piles per Day - Shutdown Zone

63.8 m - High-Frequency Cetaceans

43.2 m - Low-Frequency Cetaceans

26.2 m - Phocid Pinnipeds

3.8 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2018, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 20 40
Meters

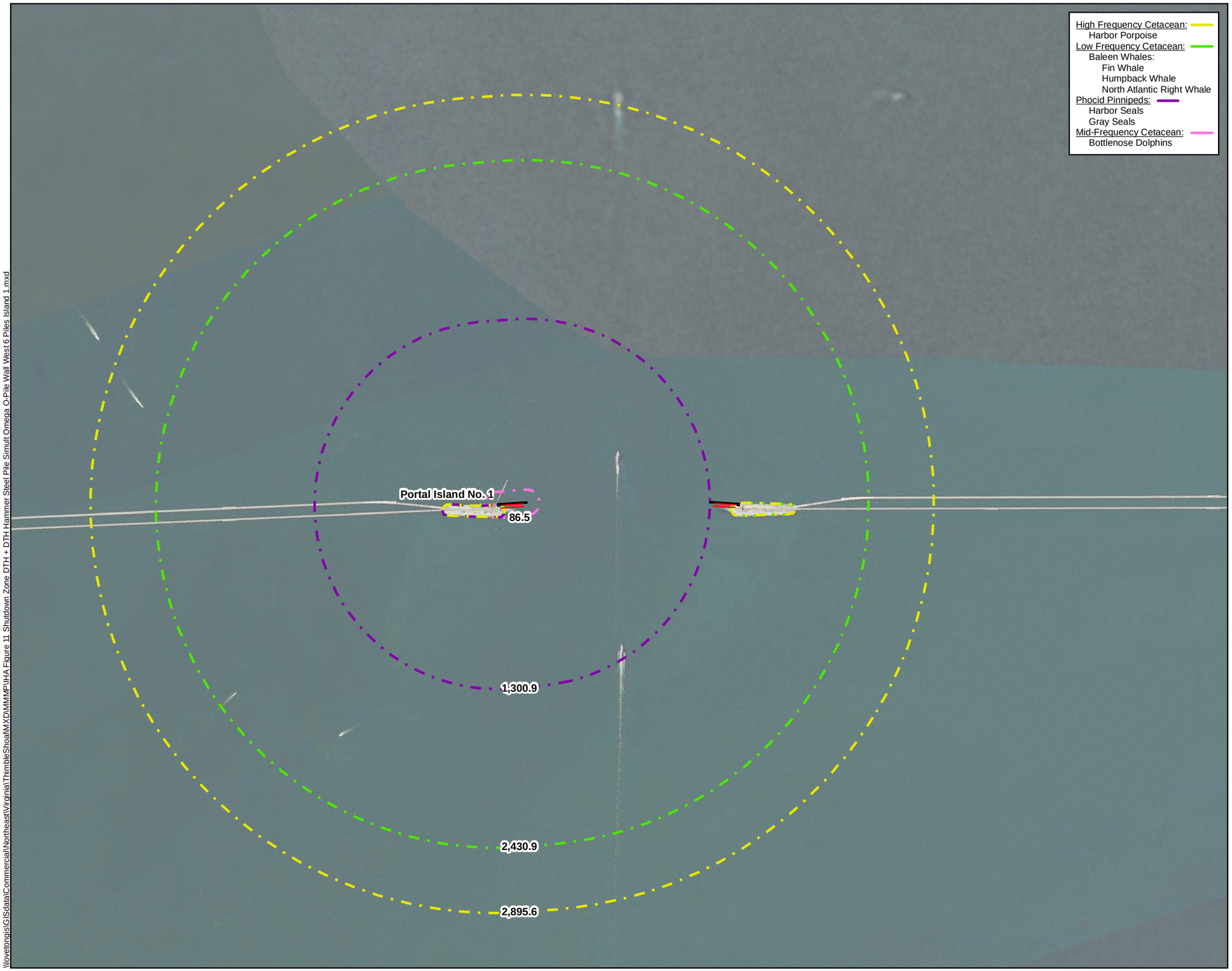
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 3
Distance (meters) to Shutdown Zone Using a Vibratory Hammer for Non-Simultaneous 36- and 42-in Steel Pile Driving for the Temporary Dock – 10 Piles per Day at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GIS\data\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\HA Figure 10 Shutdown Zone Vibratory Hammer Steel Pile Non-Simult Dock 10 Piles Island 1 and 2.mxd



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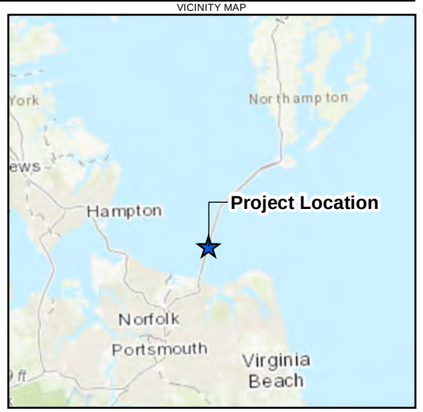


Legend

- O-Pile Wall
- Omega Trestle

6 Down-the-Hole Piles per Day - Shutdown Zone

- 2,895.6 m - High-Frequency Cetaceans
- 2,430.9 m - Low-Frequency Cetaceans
- 1,300.9 m - Phocid Pinnipeds
- 86.5 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2017, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 500 1,000
Meters

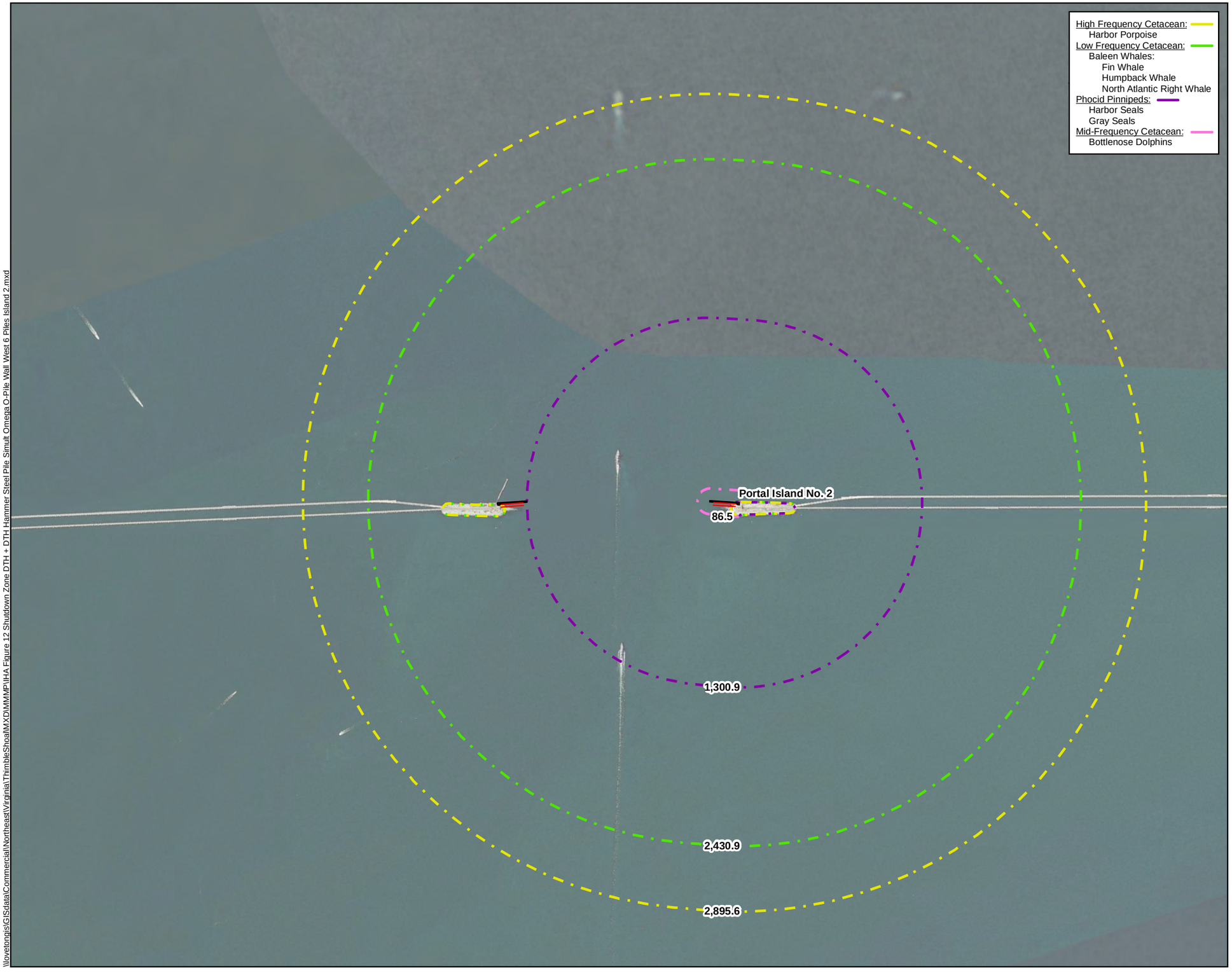
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 4
Distance (meters) to Shutdown Zone Using Two Down-the-Hole Hammers for Simultaneous 36- and 42-in Steel Pile Driving for the Omega Trestle/West O-Pile Wall/ Mooring Piles and Templates – 6 Piles per Day at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GIS\data\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMMP\IHA Figure 11 Shutdown Zone DTH + DTH Hammer Steel Pile Simult Omega O-Pile Wall West 6 Piles Island 1.mxd



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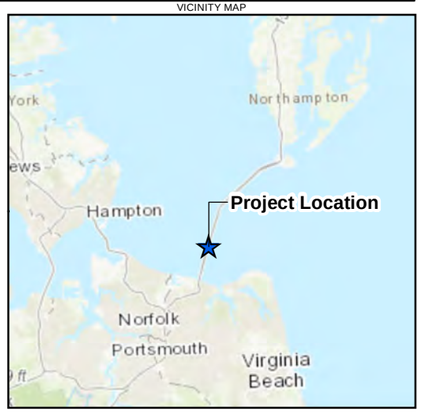


Legend

- O-Pile Wall
- Omega Trestle

6 Down-the-Hole Piles per Day - Shutdown Zone

- 2,895.6 m - High-Frequency Cetaceans
- 2,430.9 m - Low-Frequency Cetaceans
- 1,300.9 m - Phocid Pinnipeds
- 86.5 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2017, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 500 1,000
Meters

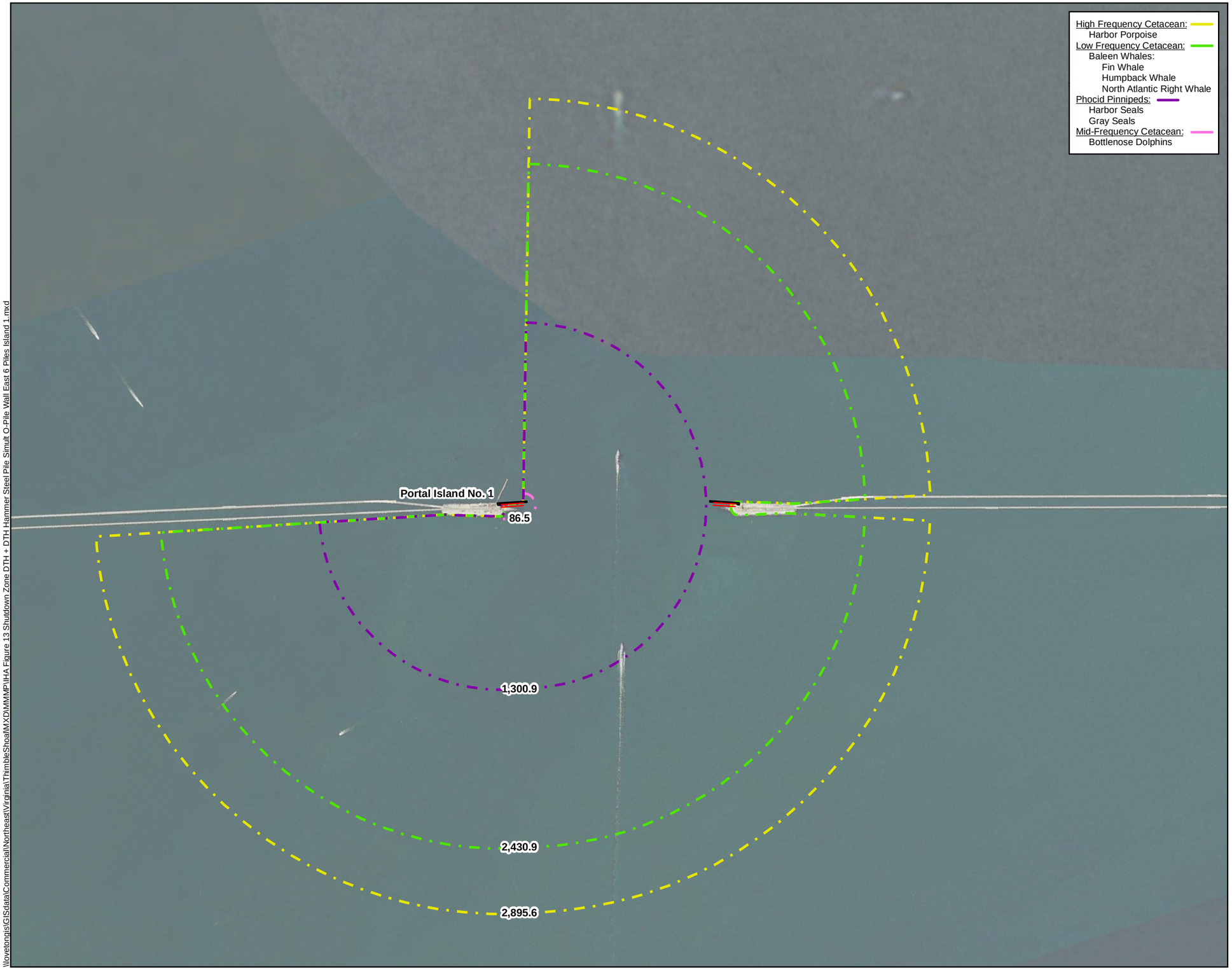
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 5
Distance (meters) to Shutdown Zone Using Two Down-the-Hole Hammers for Simultaneous 36- and 42-in Steel Pile Driving for the Omega Trestle/West O-Pile Wall/ Mooring Piles and Templates – 6 Piles per Day at Portal Island No. 2
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GIS\data\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\HA Figure 12 Shutdown Zone DTH + DTH Hammer Steel Pile Simult Omega O-Pile Wall West 6 Piles Island 2.mxd



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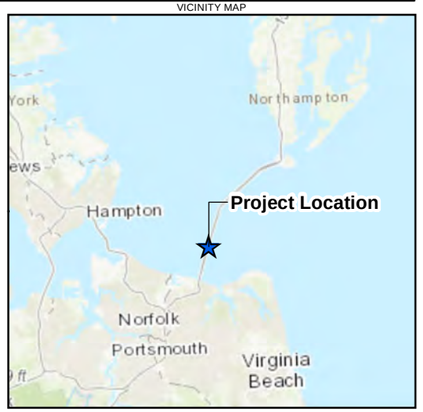


Legend

- O-Pile Wall
- Omega Trestle

6 Down-the-Hole Piles per Day - Shutdown Zone

- 2,895.6 m - High-Frequency Cetaceans
- 2,430.9 m - Low-Frequency Cetaceans
- 1,300.9 m - Phocid Pinnipeds
- 86.5 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2017, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 500 1,000
Meters

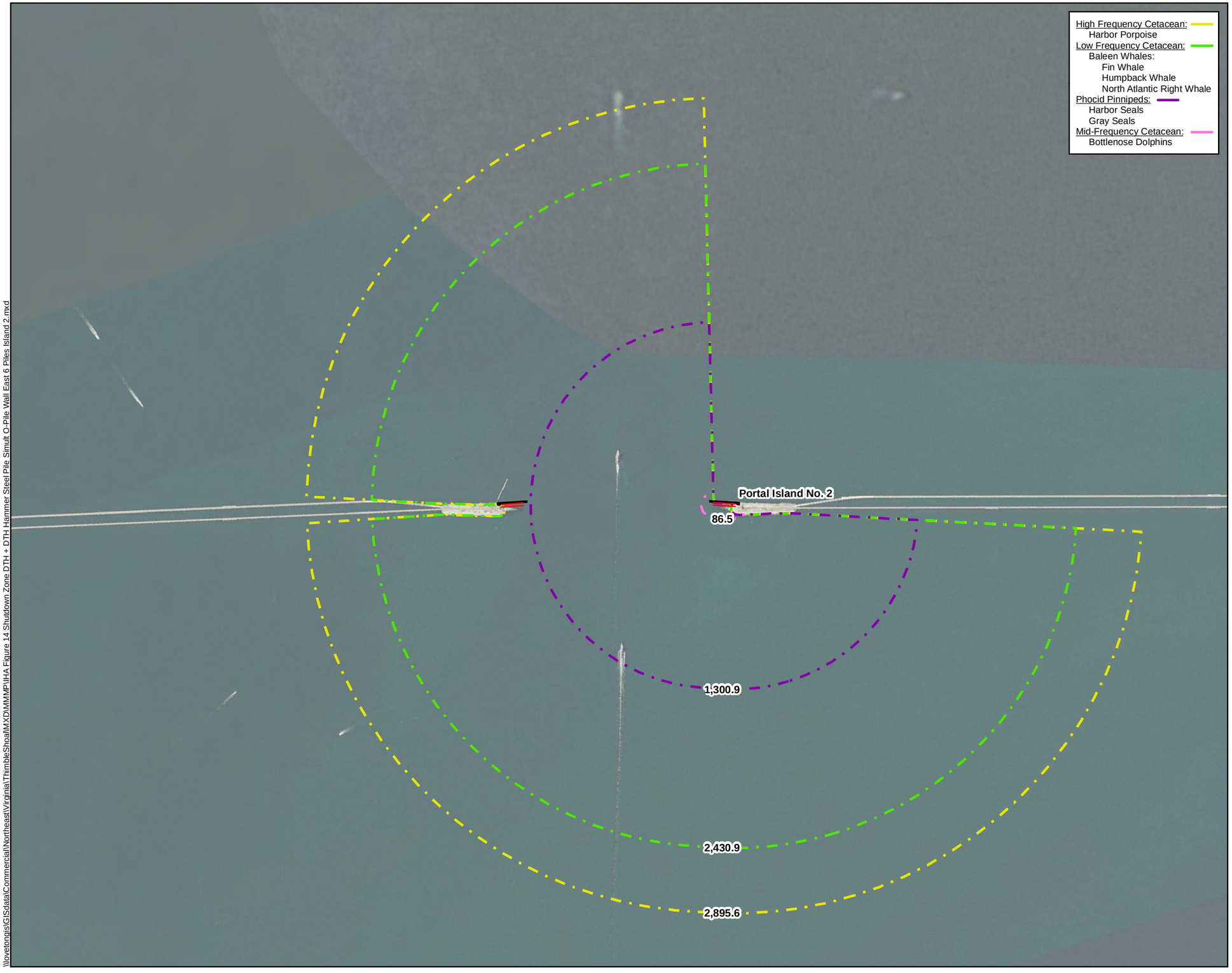
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 6
Distance (meters) to Shutdown Zone Using Two Down-the-Hole Hammers for Simultaneous 36- and 42-in Steel Pile Driving for the East O-Pile Wall – 6 Piles per Day at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetonqis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\HA Figure 13 Shutdown Zone DTH + DTH Hammer Steel Pile Simult O-Pile Wall East 6 Piles Island 1.mxd



VICINITY MAP

Legend

- O-Pile Wall
- Omega Trestle

6 Down-the-Hole Piles per Day - Shutdown Zone

- 2,895.6 m - High-Frequency Cetaceans
- 2,430.9 m - Low-Frequency Cetaceans
- 1,300.9 m - Phocid Pinnipeds
- 86.5 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2017, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 500 1,000
Meters

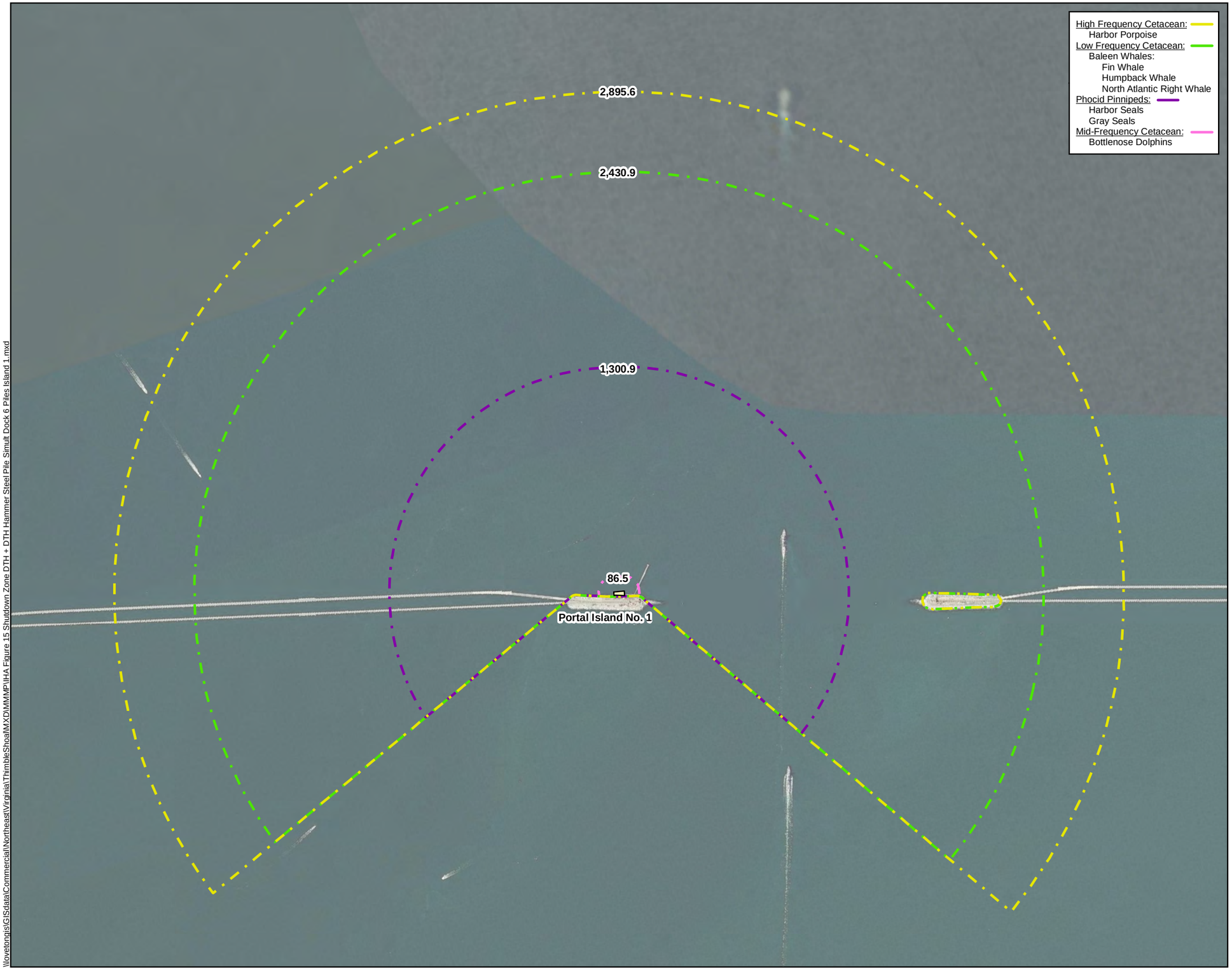
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 7
Distance (meters) to Shutdown Zone Using Two Down-the-Hole Hammers for Simultaneous 36- and 42-in Steel Pile Driving for the East O-Pile Wall – 6 Piles per Day at Portal Island No. 2
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GIS\data\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\HA Figure 14 Shutdown Zone DTH + DTH Hammer Steel Pile Simult O-Pile Wall East 6 Piles Island 2.mxd



\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMP\IHA Figure 15 Shutdown Zone DTH + DTH Hammer Steel Pile Simult Dock 6 Piles Island 1.mxd

VICINITY MAP

Legend

- Temporary Dock

6 Down-the-Hole Piles per Day - Shutdown Zone

- 2,895.6 m - High-Frequency Cetaceans
- 2,430.9 m - Low-Frequency Cetaceans
- 1,300.9 m - Phocid Pinnipeds
- 86.5 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2018, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 400 800
Meters

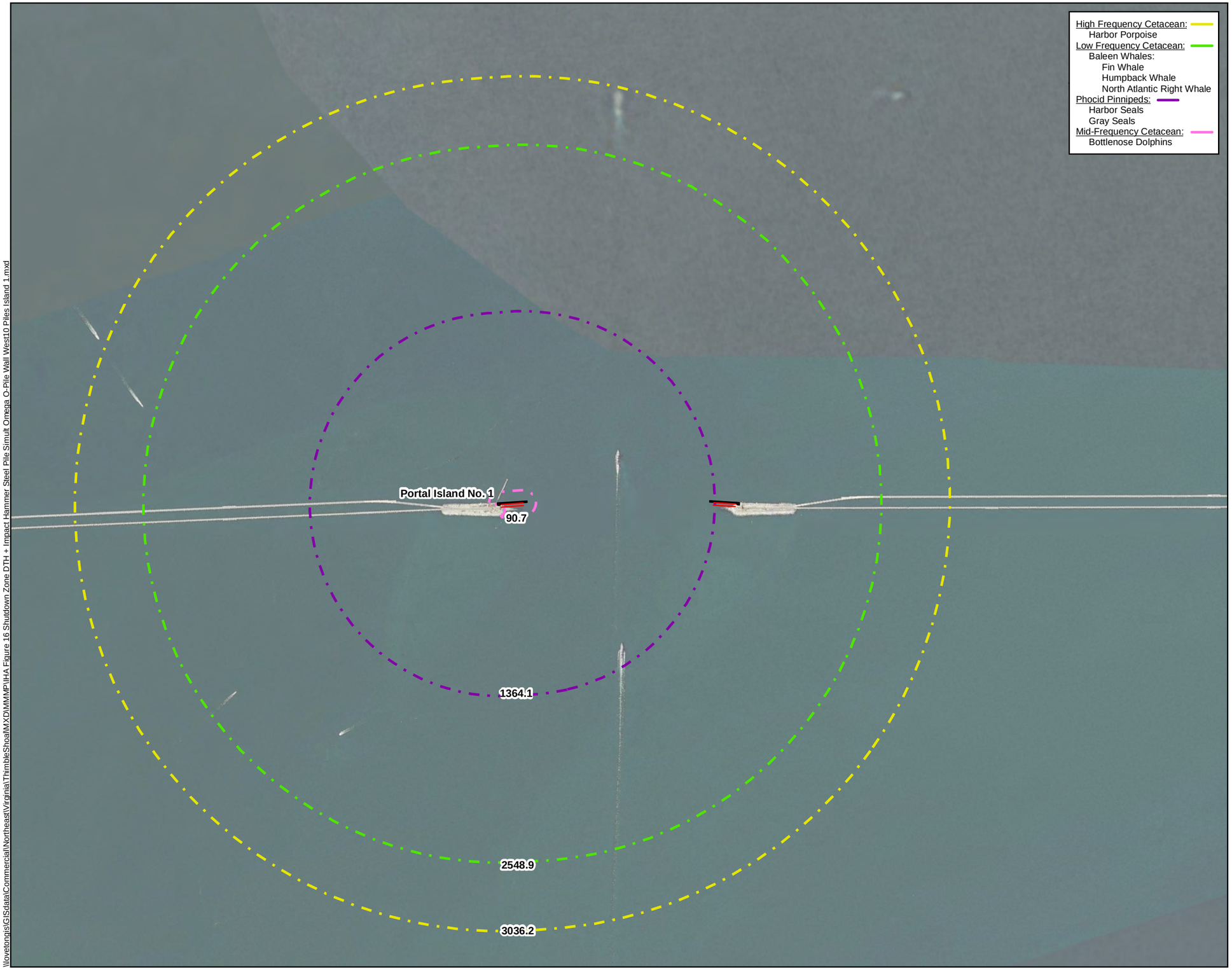
N

CHESAPEAKE TUNNEL JV

EA

MOTT MACDONALD

Figure 8
Distance (meters) to Shutdown Zone Using Two Down-the-Hole Hammers for Simultaneous 36- and 42-in Steel Pile Driving for the Temporary Dock – 6 Piles per Day at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel



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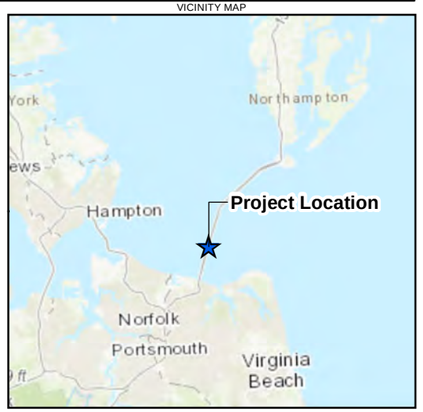


Legend

- O-Pile Wall
- Omega Trestle

3 Down-the-Hole and 10 Impact Piles per Day - Shutdown Zone

- 3036.2 m - High-Frequency Cetaceans
- 2548.9 m - Low-Frequency Cetaceans
- 1364.1 m - Phocid Pinnipeds
- 90.7 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2017, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 500 1,000
Meters

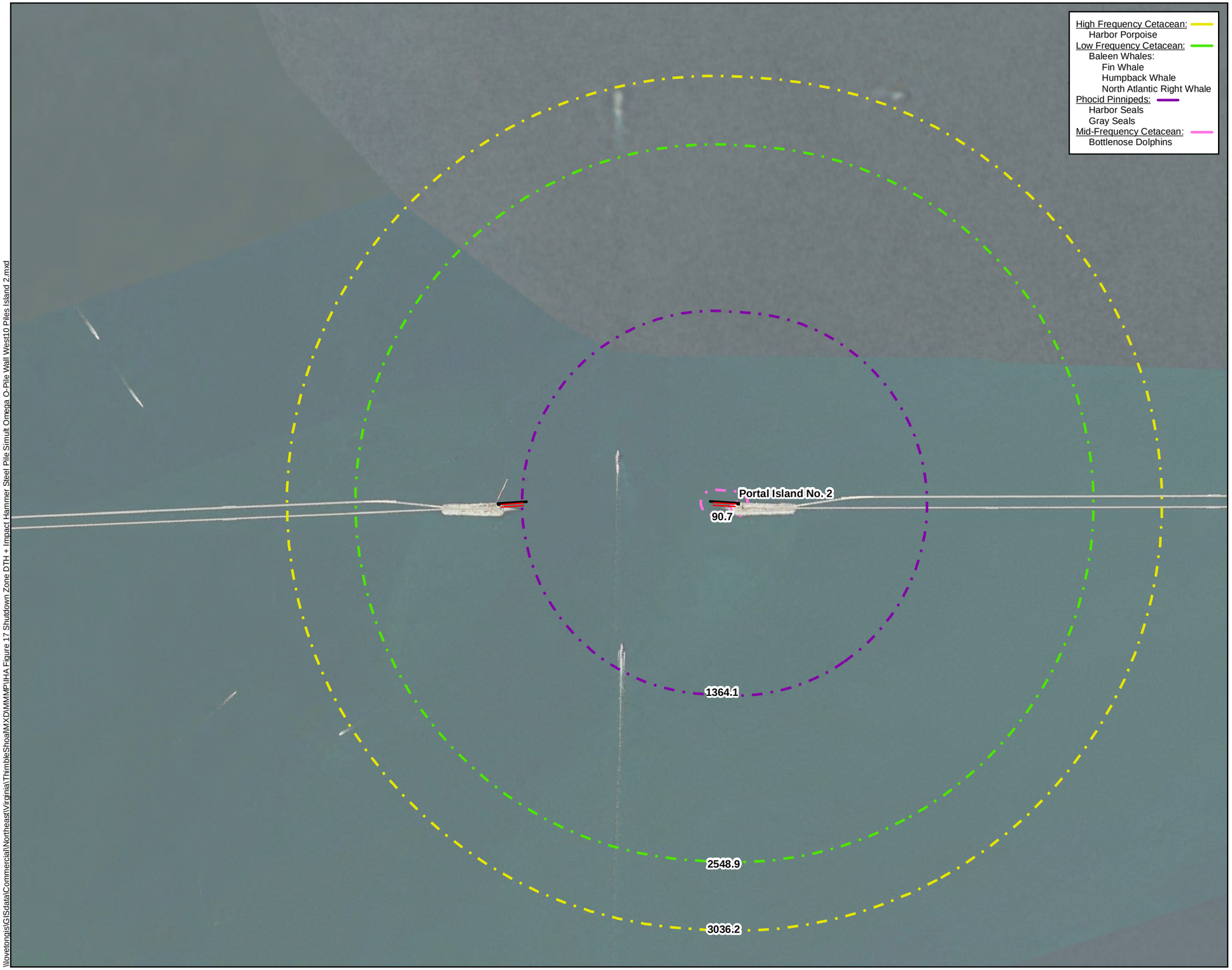
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 9
Distance (meters) to Shutdown Zone Using a Down-the-Hole and Impact Hammers for Simultaneous 36- and 42-in Steel Pile Driving for the Omega Trestle/West O-Pile Wall/ Mooring Piles and Templates – 3 DTH and 10 Piles per Day at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMP\IHA Figure 16 Shutdown Zone DTH + Impact Hammer Steel Pile Simult Omega O-Pile Wall West10 Piles Island 1.mxd



VICINITY MAP

Legend

- O-Pile Wall
- Omega Trestle

3 Down-the-Hole and 10 Impact Piles per Day - Shutdown Zone

- 3036.2 m - High-Frequency Cetaceans
- 2548.9 m - Low-Frequency Cetaceans
- 1364.1 m - Phocid Pinnipeds
- 90.7 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2017, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 500 1,000
Meters

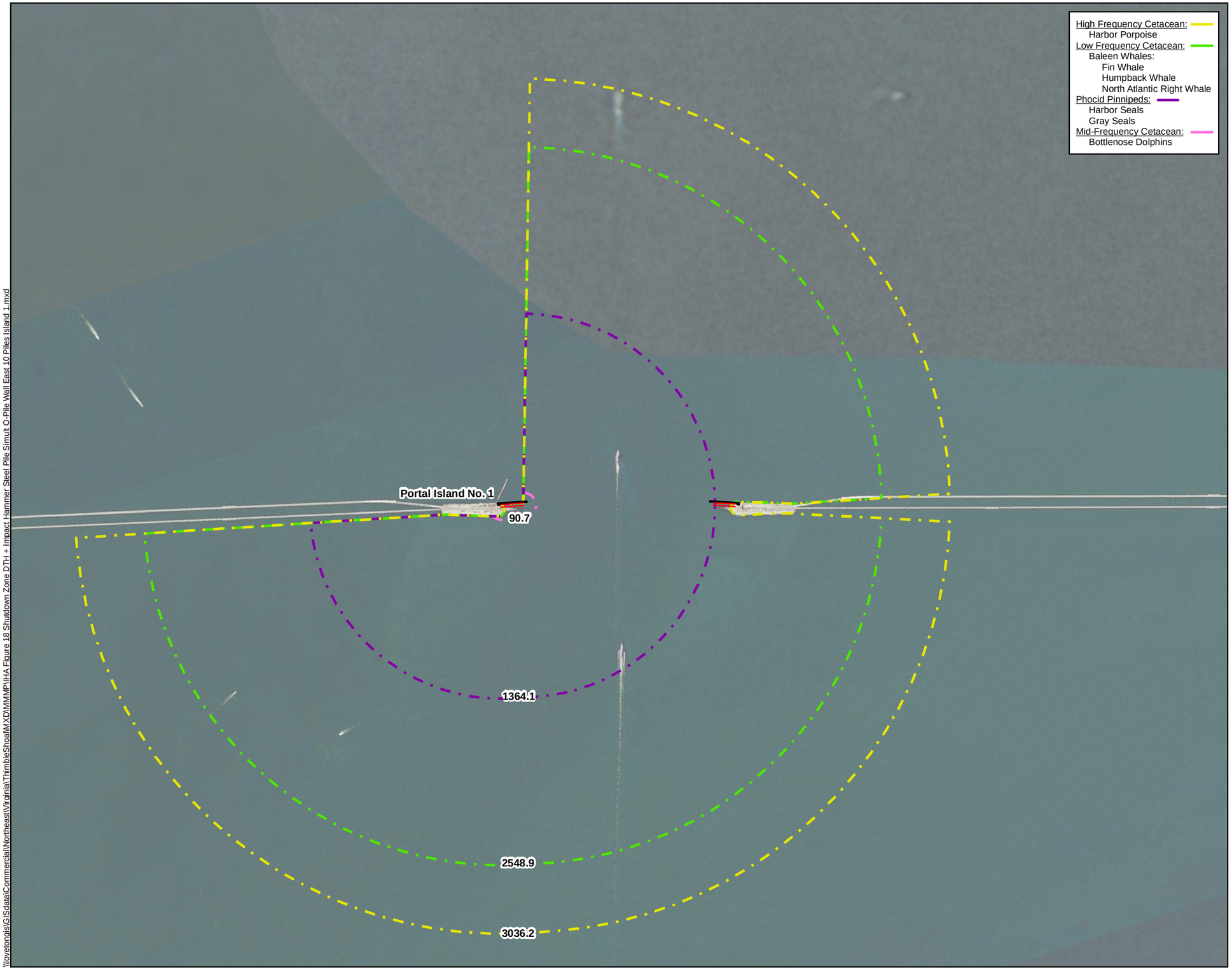
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 10
Distance (meters) to Shutdown Zone Using a Down-the-Hole and Impact Hammers for Simultaneous 36- and 42-in Steel Pile Driving for the Omega Trestle/West O-Pile Wall/ Mooring Piles and Templates – 3 DTH and 10 Piles per Day at Portal Island No. 2
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMP\IHA Figure 17 Shutdown Zone DTH + Impact Hammer Steel Pile Simult Omega O-Pile Wall West10 Piles Island 2.mxd



VICINITY MAP

Legend

- O-Pile Wall
- Omega Trestle

3 Down-the-Hole and 10 Impact Piles per Day - Shutdown Zone

- 3036.2 m - High-Frequency Cetaceans
- 2548.9 m - Low-Frequency Cetaceans
- 1,364.1 m - Phocid Pinnipeds
- 90.7 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2017, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 500 1,000
Meters

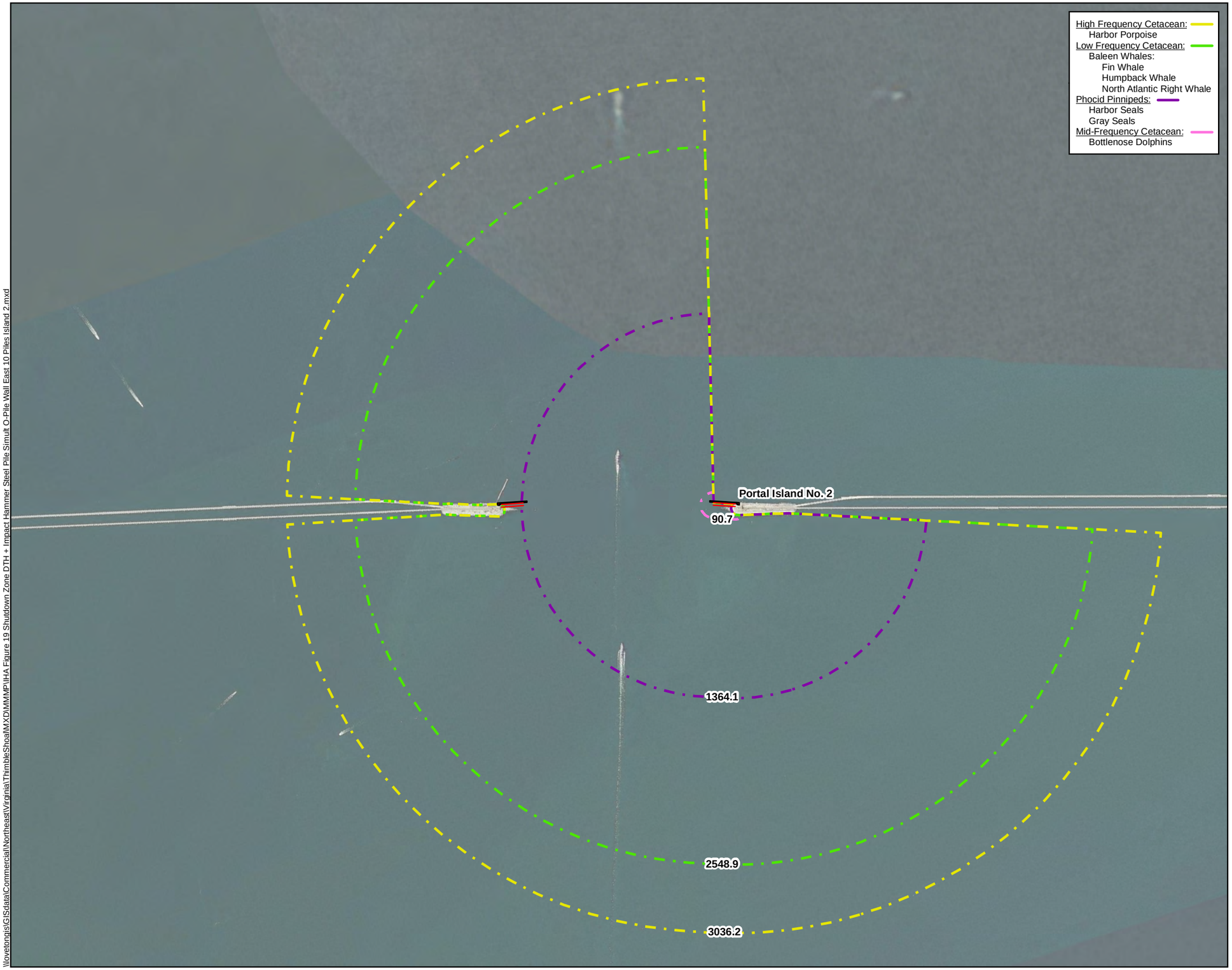
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 11
Distance (meters) to Shutdown Zone Using a Down-the-Hole and Impact Hammers for Simultaneous 36- and 42-in Steel Pile Driving for the East O-Pile Wall – 3 DTH and 10 Impact Piles per Day at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\IHA Figure 18 Shutdown Zone DTH + Impact Hammer Steel Pile Simult O-Pile Wall East 10 Piles Island 1.mxd



VICINITY MAP

Legend

- O-Pile Wall
- Omega Trestle

3 Down-the-Hole and 10 Impact Piles per Day - Shutdown Zone

- 3036.2 m - High-Frequency Cetaceans
- 2548.9 m - Low-Frequency Cetaceans
- 1364.1 m - Phocid Pinnipeds
- 90.7 m - Mid-Frequency Cetaceans

Map Date: 10/3/2019
Source: ESRI 2017, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 500 1,000
Meters

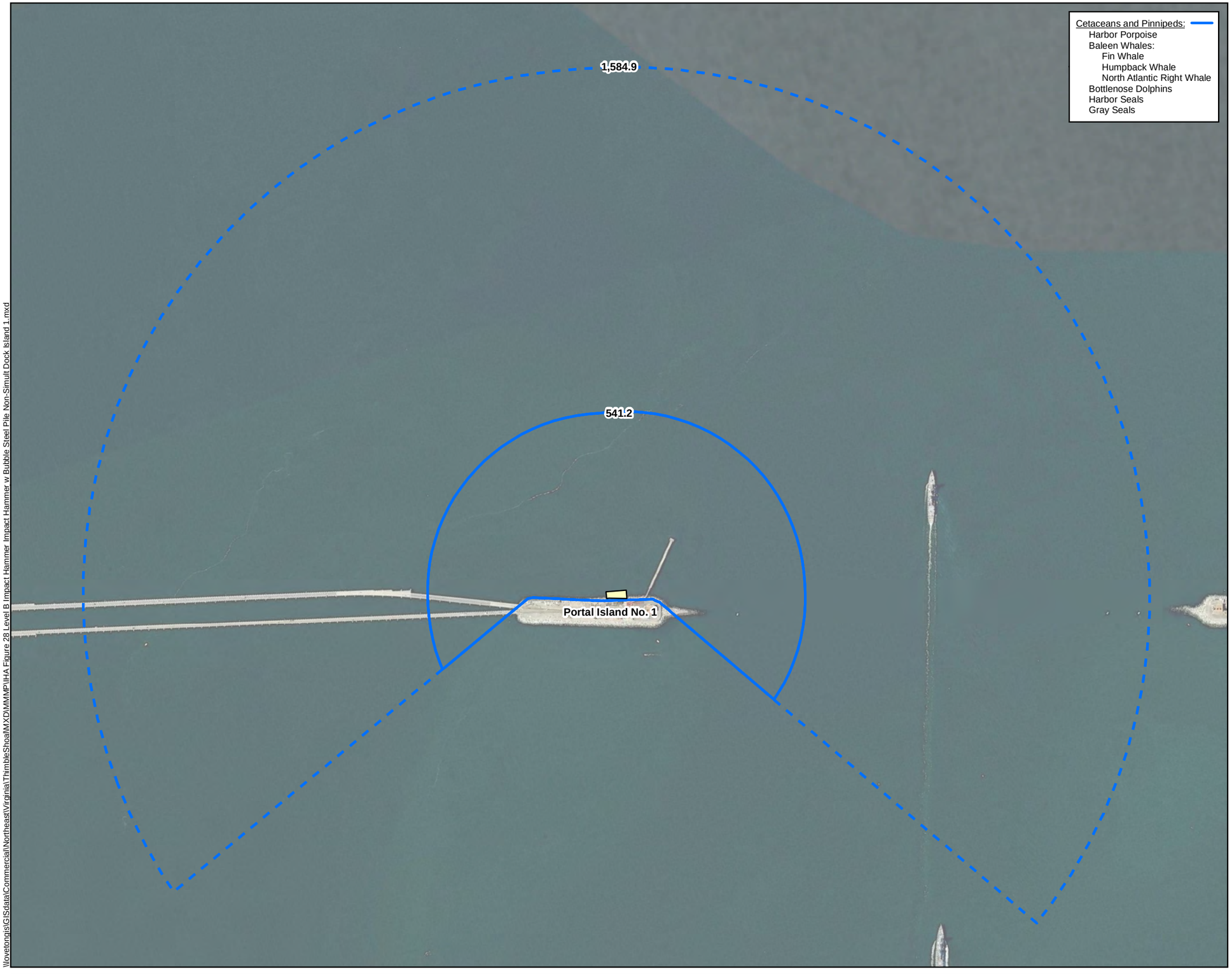
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure 12
Distance (meters) to Shutdown Zone Using a Down-the-Hole and Impact Hammers for Simultaneous 36- and 42-in Steel Pile Driving for the East O-Pile Wall – 3 DTH and 10 Impact Piles per Day at Portal Island No. 2
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\IHA Figure 19 Shutdown Zone DTH + Impact Hammer Steel Pile Simult O-Pile Wall East 10 Piles Island 2.mxd



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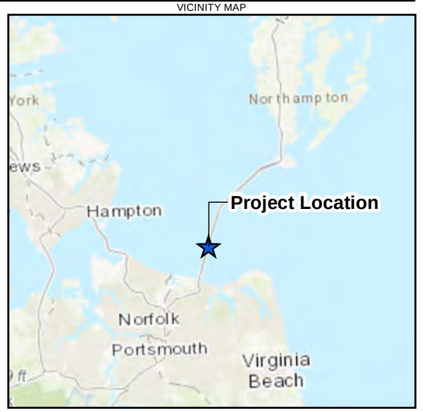


Legend

Temporary Dock

Impact Pile - Level B

1,584.9 m - Cetaceans and Pinnipeds

Impact Pile with Bubble Curtain - Level B

541.2 m - Cetaceans and Pinnipeds

Map Date: 10/3/2019
Source: ESRI 2018, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 200 400
Meters

N

CHESAPEAKE TUNNEL JV

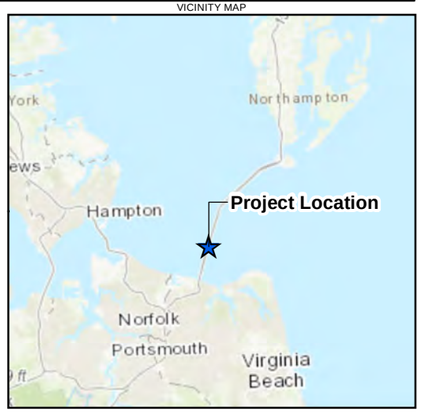
EA

MOTT MACDONALD

Figure **13**
Distance (meters) to Level B Threshold Using an Impact Hammer or Impact Hammer with Bubble Curtain for Non-Simultaneous 36- and 42-in Steel Pile Driving for the Temporary Dock at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPIUHA Figure 28 Level B Impact Hammer Impact Hammer w Bubble Steel Pile Non-Simult Dock Island 1.mxd

VICINITY MAP



Legend

⊗ Mooring Dolphin

Impact Pile - Level B

21.5 m - Cetaceans and Pinnipeds

Vibratory Pile - Level B

1,359.4 m - Cetaceans and Pinnipeds

Map Date: 10/3/2019
Source: ESRI 2018, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 200 400
Meters

N

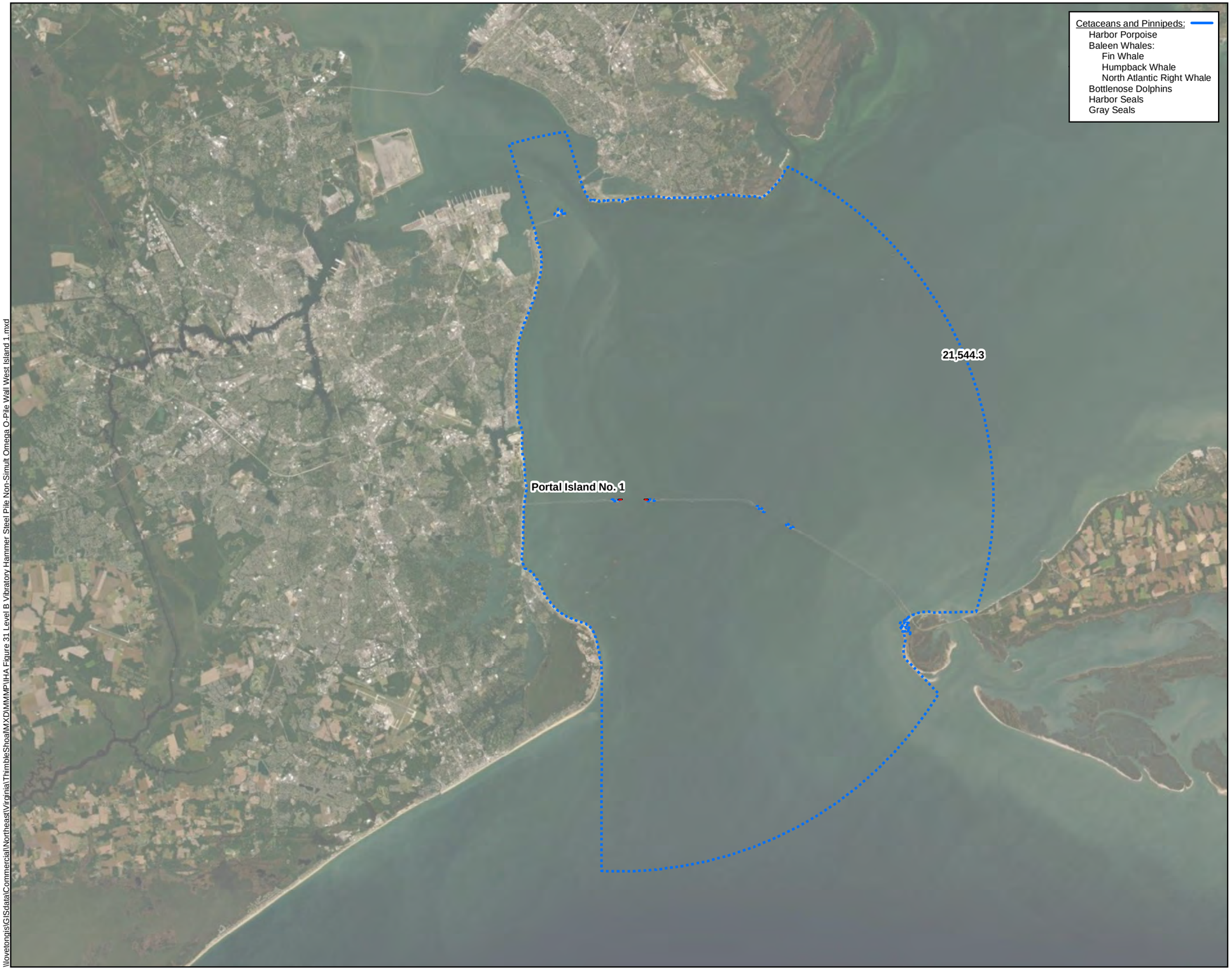
CHESAPEAKE TUNNEL JV

EA

MOTT MACDONALD

Figure **14**
Distance (meters) to Level B Threshold Using an Impact Hammer or Vibratory Hammer for Non-Simultaneous Timber Pile Driving for the Mooring Dolphins at Portal Island Nos. 1 and 2
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GIS\data\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\HA Figure 30 Level B Impact Hammer Vibratory Hammer Timber Pile Non-Simult Mooring Dolphins Island 1 and 2.mxd



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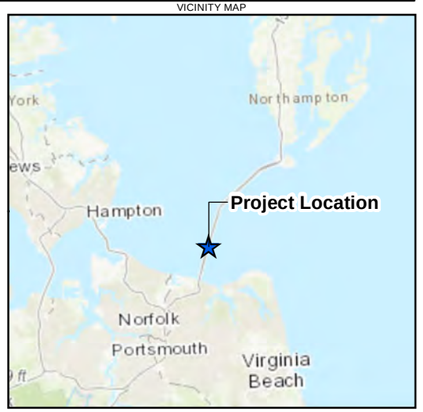


Legend

O-Pile Wall

Omega Trestle

Vibratory Steel Piles - Level B

21,544.3 m - Cetaceans and Pinnipeds

Map Date: 10/3/2019
Source: ESRI 2018, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 4,000 8,000
Meters

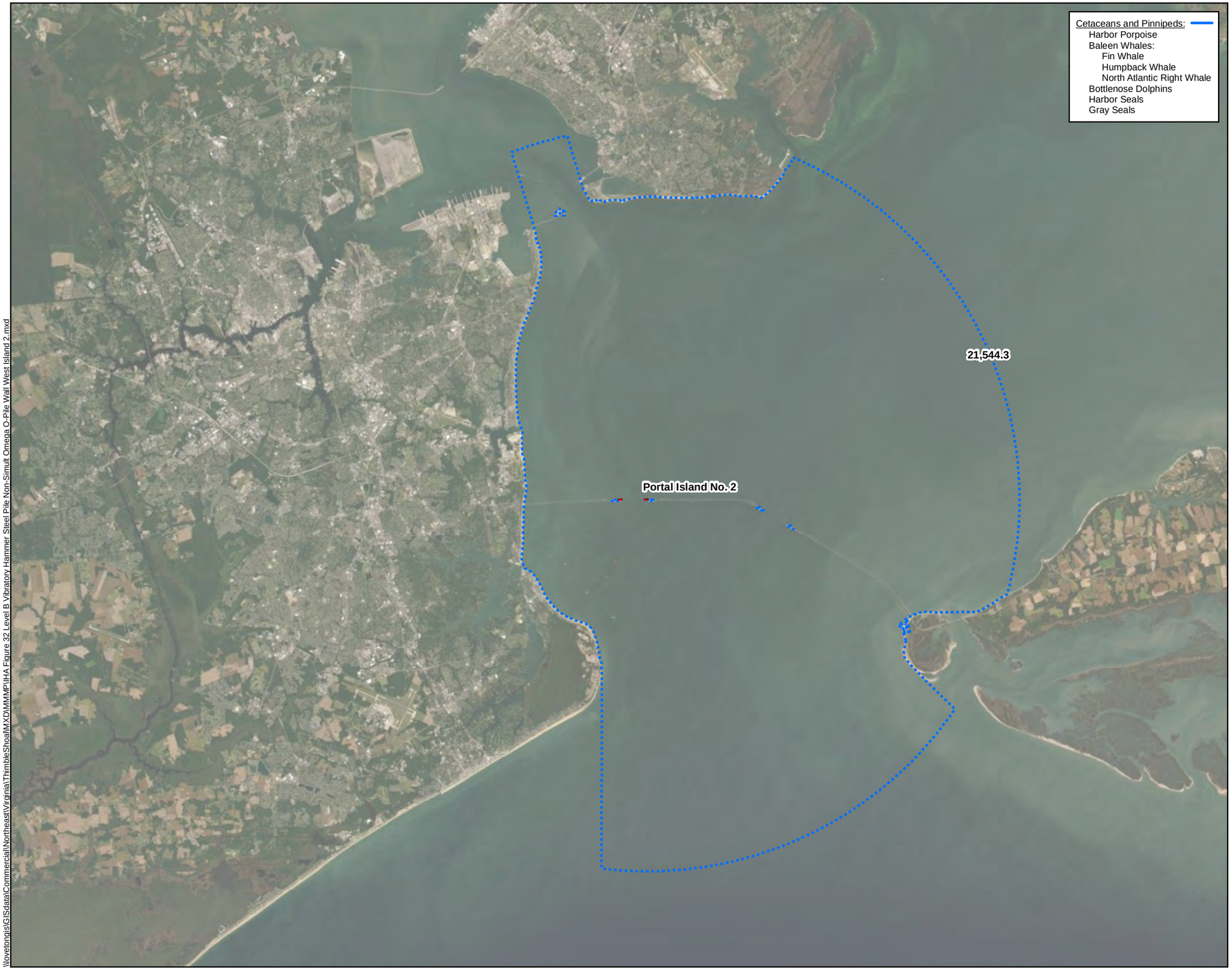
N

CHESAPEAKE TUNNEL JV

MOTT MACDONALD

Figure **15**
Distance (meters) to Level B Threshold Using a Vibratory Hammer for Non-Simultaneous 36- and 42-in Steel Pile Driving for the Omega Trestle/West O-Pile Wall/ Mooring Piles and Templates at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\IHA Figure 31 Level B Vibratory Hammer Steel Pile Non-Simult Omega O-Pile Wall West Island 1.mxd



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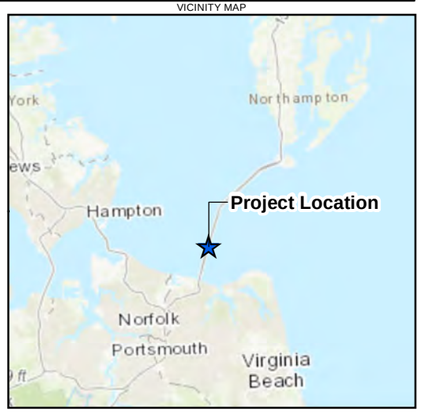


Legend

O-Pile Wall

Omega Trestle

Vibratory Steel Piles - Level B

21,544.3 m - Cetaceans and Pinnipeds

Map Date: 10/3/2019
Source: ESRI 2018, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 4,000 8,000
Meters

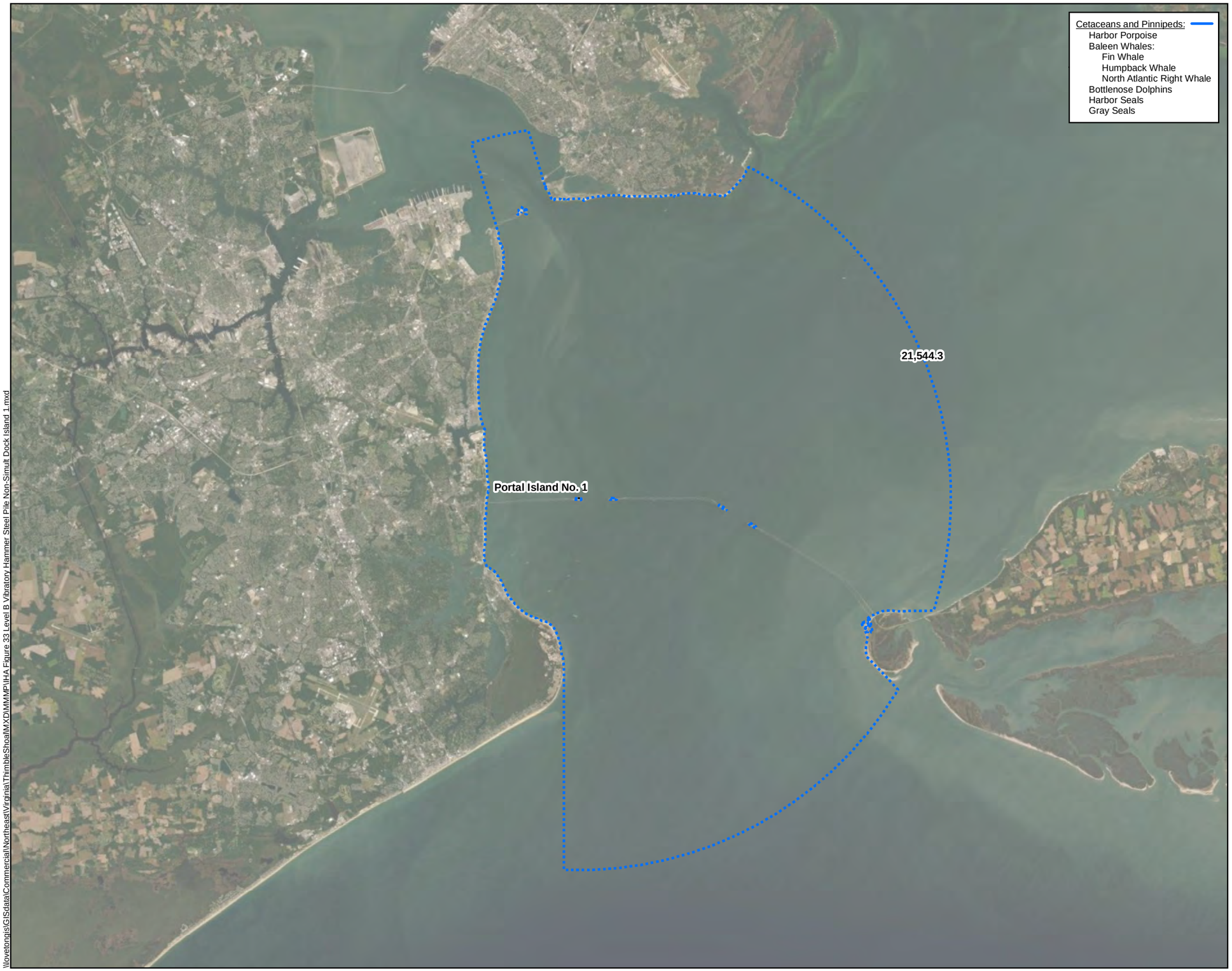
N

CHESAPEAKE TUNNEL JV

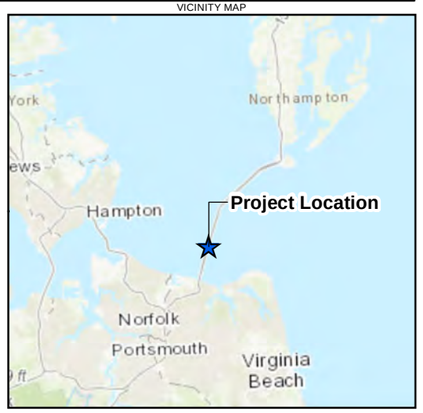
MOTT MACDONALD

Figure **16**
Distance (meters) to Level B Threshold Using a Vibratory Hammer for Non-Simultaneous 36- and 42-in Steel Pile Driving for the Omega Trestle/West O-Pile Wall/ Mooring Piles and Templates at Portal Island No. 2
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\IHA Figure 32 Level B Vibratory Hammer Steel Pile Non-Simult Omega O-Pile Wall West Island 2.mxd



VICINITY MAP



Legend

Temporary Dock

Vibratory Steel Piles - Level B

21,544.3 m - Cetaceans and Pinnipeds

Map Date: 10/3/2019
Source: ESRI 2018, Mott MacDonald 2017
Projection: NAD 1983, State Plane Virginia South, US Feet

0 4,000 8,000
Meters

N

CHESAPEAKE TUNNEL JV

EA

MOTT MACDONALD

Figure **17**
Distance (meters) to Level B Threshold Using a Vibratory Hammer for Non-Simultaneous 36- and 42-in Steel Pile Driving for the Temporary Dock at Portal Island No. 1
Marine Mammal Protection Act
Parallel Thimble Shoal Tunnel

\\lovetongis\GISdata\Commercial\Northeast\Virginia\ThimbleShoal\MXD\MMPI\HA Figure 33 Level B Vibratory Hammer Steel Pile Non-Simult Dock Island 1.mxd

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APPENDIX B-

Daily Marine Mammal Observer Reports (REMSA), Protected Species Sighting & Shut-Down Forms (REMSA) and Master Sightings, Shutdown and Delay Table (AZURA)

3/9/2021

Daily Marine Mammal Observer Report

Contractor: CTJV / Dragados	Project Name: CTJV Parallel Thimble Shoals Tunnel
NOAA/NMFS Permit: IHA March 2020	Observer Location (Island #): 2
Date: 03/09/21	Shift Start: 1200
Sunrise: 06:25 Sunset: 18:05	Shift End: 1707

Weather and Visibility Information

Location	Time	Air Temp (F)	Water Temp (F)	Visibility (Good, Fair, Poor)	Cloud Cover (%)	Wave Height (ft)	Wind Speed & Direction	Precipitation	Beaufort Scale
Island #2	1200	50.4	45.5	Good	10%	0.3	5.1 kn W	0%	1
Island #2	1500	68.5	46.8	Good	25%	0.3	7.0 kn W	0%	1
Island #2	1707	69.2	46.8	Good	75%	0.5	6.0 kn W	0%	1

Observer Log

Time	Notes: (pre-watch times, start and stop times for pile driving activities, shift changes, human actiivties)
1200	started pre-watch
1225	Sighted two harbor seals swimming near rocks
1230	Pre-Clearance over - two seals are now hauled out on rocks
1335	Seals still hauled out on rocks
1345	Both seals have left rock, are milling/swimming
1420	Last time seals seen
1510	One seal sighted - swimming and feeding around rocks
1602	Started ~~pre~~ mountstove pile driving (impact)
1618	First pile complete (impact hammering)
1628	Started impact pile driving (2nd pile)
1637	Second pile complete (impact hammering)
1637	Started post-watch
1707	Post-watch complete

Sighting Log

Time	Species	Total Number	# Adults	# of Juveniles	Closest Distance to Pile Driving	Activity or Behaviors	Shut down? (yes/no)	Time of Shut-down	Time of Start Up	Time last seen
1225	Harbor seal	2	2	0	150 m	swimming	no	-	-	1420
1510	Harbor seal	1	1	0	60 m	swimming	no	-	-	1605

Daily Summary

Species	Total Number	Takes in Zone A	Takes in Zone B	# Shut-Downs	Comments
Harbor Seal	1	1	0	0	Moved away when driving started

Observer Names: Jessica Roberts, Greg Jenssen

REMSA, Inc. 142 W Queeens Way Hampton, VA 23669
757-722-0113

3/9/2021

Protected Species Sighting & Shut-Down Form

Corresponding sighting # for the day: _____

Shutdown: _____ for the day

Date (DD/MM/YYYY): 03/09/21 **Time of Initial Sighting** 1225 **Time Animals Left Area:** 1604

Project Name: CTJV Thimble Shoals Parallel Tunnel **Island No.** 2

Areas Observed: Island # 2 **Upland Pile Driving** ____ **In-Water Pile Driving** X

Air Temp: 50.4 **Water Temp:** 45.5 **Wave Height** 0.3 **Beaufort Sea State** 1

Weather Conditions: Sunny

Percent Cloud Cover: 10% **Percent Glare:** 0% **Visibility Issues:** none

Animal Location & Distance to Pile Driving: South of piles near jetty 60m
Type of Pile Driving Impact 36" steel
Distance From Observer When Initially Observed: 250M
Species Observed: Harbor seal
Number of Animals Sighted (include age classes): 2 adults
Sex of Animals Observed: Unknown
Animal Behaviors Observed: swimming/diving
Animal Heading/Direction: All
Human Activities in Area: Construction/pile driving

Shutdown Information

Time Begin:	N/A
Time End:	"
Total Down Time (mins):	"

Shutdown # for the day: 0

Video or Photograph Taken?: No (Yes)

Brief Description of Footage or Photograph: Photographs taken before pile-driving. ~~Harbor~~ Hauled out, swimming.

Notes: First observed approaching from the south. Came halfway up the east-side of the jetty and hauled out for about an hour swimming and diving after until last sighting 1510 1 harbor seal sighted on West side of jetty diving/swimming. Last sighted at 1604, two minutes after pile-driving started. Closest approach to active pile driving was 60M

REMSA, Inc.
124 W. Queens Way
Hampton, VA 23669
(757)722-0113

REMSA MESO

GREG JENSEN
Observer Name / Signature
Jessica Roberts

3/11/2021

Daily Observer Log Form

REMSA MESO

Contractor: CTJV	
NOAA/NMFS Permit: IHA March 9, 2022	Project Name: CTJV Parallel Thimble Shoal Tunnel
Observer Names: Ashleigh Thomas, Jessica Roberts	CBBT Island Number: 2
Date: 03/11/2021	Shift Start: 0630 Shift End:
	Sunrise: 0620 Sunset: 0607

Weather and Visibility Information

Location	Time	Air Temp (F)	Water Temp	Visibility (Good, Fair,	Cloud Cover (%)	Wave Height (ft)	Wind Speed & Direction	Precipitation	Beaufort Scale
CBBT ISN #2	0713	54.1	46.8	Good	40%	0.3ft	8 knots W	0%	3
CBBT island 2	1005	54	46.8	Good	25%	0.3ft	8 knots W	0%	3

Observer Logs

Time	Notes: (i.e., start and stop times for pile driving activities, shift changes, nearby human actiivties.)
0715	Arrived on island 2
0720	Update from foreman, not ready yet, have to get hammer in position
0720	Started pre-watch
0725	Spotted seal (Harbor Seal) swimming near rocks
0750	Pre-watch complete - harbor seal swimming 30 m away from piles
0805	First hit (started impact pile driving)
0810	Spotted seal on other side of rocks (about 200 m away from driving)
0824	Paused impact pile driving (of 1st pile) to fix hammer
0830	Resumed pile driving of 1st pile
0849	Finished with 1st pile
0904	Started impact pile driving second pile
0932	Finished with second pile
0937	Started post-watch, harbor seal still swimming near rocks
1002	Spotted second harbor seal at end of post-watch

Sighting Log

Time	Species	Total Number	Adults	Juveniles	Closest Distance to Observer	Activity or Behaviors	Shut down? (yes/no)	Time of Shut-down	Time of Start Up	Time last seen
0775	Harbor seal	1	1	0	80 m	swimming	no	–	–	
1002	Harbor seal	2	2	0	80 m	swimming	no	–	–	

Daily Summary

Species	Total Number	Takes in Zone A	Takes in Zone B	# Shut-Downs	Comments
Harbor Seal	1	1	0	0	Harbor seal swimming near rocks during pile driving

3/11/2021

Protected Species Sighting & Shut-Down Form

Corresponding Sighting # for the Day: 1 Shutdown # for the Day: _____

Date (DD/MM/YYYY): 03/11/21 Time of Initial Sighting 0725 Time Animals Left Area: -

Project Name: CTJV Thimble Shoals Parallel Tunnel Island No. 2

Areas Observed: Island #2 near rocks Upland Pile Driving ____ In-Water Pile Driving ✓

Air Temp: 54.1 Water Temp: 46.8 Wave Height 0.3 Beaufort Sea State 3

Weather Conditions: Windy, sunny

Percent Cloud Cover: 50% Percent Glare: 0% Visibility Issues: none

Animal Location & Distance to Pile Driving: closest approach to pile (hadn't started) 30m
Type of Pile Driving Impact
Distance From Observer When Initially Observed: 80 m
Species Observed: Harbor seal
Number of Animals Sighted (include age classes): 2
Sex of Animals Observed: -
Animal Behaviors Observed: swimming / looking
Animal Heading/Direction: milling back and forth
Human Activities in Area: Impact pile driving

Shutdown Information

Time Begin:	-
Time End:	-
Total Down Time (mins):	-

Shutdown # for the day: -

Video or Photograph Taken?: (No) Yes

Brief Description of Footage or Photograph: _____

Notes: One harbor seal first spotted at 0725 near rocks on southern end of Island #2. Swam back and forth near end of rocks for duration of work day. At 1002, a second seal was spotted with first seal near rocks, swimming back and forth.

REMSA, Inc.
124 W. Queens Way
Hampton, VA 23669
(757)722-0113

REMSA MESO

Jessica Roberts

Observer Name / Signature

6/7/- 11/16/2021

ID	title	Observer	Date	Begin_Time	lat_Coordin	long_Coordi	accuracy_Co	UTM_Northi	UTM_Eastin	UTM_Zone_	Observation	Areas_Observed	Species	Species_Oth
1	06/07/2021	Kim Stanton	6/7/2021	8:05:00	36.966425	-76.112161	4	4091725	400999	18S	Island1	SE of Island 1	Bottlenose	
2	06/07/2021	Ashley	6/7/2021	13:38:38	36.966833	-76.113601	4	4091772	400871	18S	Island1	N & W of Island 1, traveling S	Bottlenose	
3	06/10/2021	Ashley	6/10/2021	9:38:24	36.966574	-76.113324	4	4091743	400895	18S	Island1	N of Island 1	Bottlenose	
4	06/16/2021	Ashley	6/16/2021	10:43:46	36.966415	-76.11213	4	4091724	401001	18S	Island1	S of Island 1	Bottlenose	
5	06/16/2021	Ashley	6/16/2021	11:24:23	36.966442	-76.112144	4	4091727	401000	18S	Island1	S of Island 1	Bottlenose	
6	06/21/2021	Ashley	6/21/2021	8:05:18	36.966364	-76.112186	4	4091718	400996	18S	Island1	E of Island	Bottlenose	
7	06/21/2021	Alyssa	6/21/2021	10:53:12	36.96627	-76.11219	8	4091708	400996	18S	Island1	S of island	Bottlenose	
8	06/21/2021	Alyssa	6/21/2021	13:13:08	36.96639	-76.112148	8	4091721	401000	18S	Island1	Northeast of island one	Bottlenose	
9	06/21/2021	Alyssa	6/21/2021	14:46:05	36.966431	-76.112146	6	4091726	401000	18S	Island1	East of island	Bottlenose	
10	06/21/2021	Alyssa	6/21/2021	18:49:39	36.966462	-76.112246	8	4091729	400991	18S	Island1	Northeast of island	Bottlenose	
11	06/28/2021	Kim Stanton	6/28/2021	9:45:25	36.966392	-76.112201	4	4091722	400995	18S	Island1	NE of Island 1 passing through channel	Bottlenose	
12	06/28/2021	Kim Stanton	6/28/2021	11:03:35	36.966343	-76.112221	4	4091716	400993	18S	Island1	SE of Island 1	Bottlenose	
13	06/30/2021	Ashley	6/30/2021	11:04:58	36.96638	-76.112157	4	4091720	400999	18S	Island1	SE of Island 1	Bottlenose	
14	06/30/2021	Ashley	6/30/2021	12:22:41	36.966392	-76.112199	4	4091722	400995	18S	Island1	SE of Island 1	Bottlenose	
15	06/30/2021	Kim Stanton	6/30/2021	17:25:07	36.966528	-76.112228	4	4091737	400993	18S	Island1	NE of Island 1	Bottlenose	
16	07/01/2021	Ashley	7/1/2021	9:10:00	36.96646	-76.112197	4	4091729	400995	18S	Island1	S of Island 1	Bottlenose	
17	07/01/2021	Ashley	7/1/2021	13:05:00	36.96648	-76.112169	4	4091731	400998	18S	Island1	S of Island 1	Bottlenose	
18	07/01/2021	Ashley	7/1/2021	14:29:00	36.966434	-76.112193	4	4091726	400996	18S	Island1	SE of Island 1	Other	Loggerhead
19	07/01/2021	Ashley	7/1/2021	15:25:00	36.966501	-76.112191	4	4091734	400996	18S	Island1	SE of Island 1	Bottlenose	
20	07/06/2021	Alyssa	7/6/2021	9:10:22	36.966394	-76.11225	6	4091722	400991	18S	Island1	East of island	Bottlenose	
21	07/06/2021	Alyssa	7/6/2021	9:50:00	36.966353	-76.112159	4	4091717	400999	18S	Island1	east of island 1	Bottlenose	
22	07/06/2021	Alyssa	7/6/2021	9:56:00	36.966408	-76.11217	4	4091723	400998	18S	Island1	East of island 1	Bottlenose	
23	07/06/2021	Alyssa	7/6/2021	10:09:31	36.966348	-76.112162	4	4091717	400998	18S	Island1	E of island 1	Bottlenose	
24	07/06/2021	Alyssa	7/6/2021	10:58:31	36.966346	-76.112197	4	4091716	400995	18S	Island1	East of island 1	Bottlenose	
25	07/06/2021	Ashley	7/6/2021	11:04:36	36.966608	-76.113295	4	4091747	400898	18S	Island1	N of Island 1	Bottlenose	
26	07/06/2021	Alyssa	7/6/2021	11:04:55	36.966374	-76.112181	5	4091720	400997	18S	Island1	North east of island 1	Bottlenose	
27	07/06/2021	Alyssa	7/6/2021	11:22:52	36.96636	-76.112128	4	4091718	401001	18S	Island1	e of island 1	Bottlenose	
28	07/06/2021	Alyssa	7/6/2021	12:03:02	36.966402	-76.112184	4	4091723	400996	18S	Island1	East of island 2	Bottlenose	
29	07/06/2021	Alyssa	7/6/2021	15:05:21	36.966398	-76.112176	7	4091722	400997	18S	Island1	NE of island 1	Bottlenose	
30	07/06/2021	Ashley	7/6/2021	15:40:00	36.966536	-76.113293	4	4091739	400898	18S	Island1	NW of Island 1	Bottlenose	
31	07/06/2021	Alyssa	7/6/2021	15:54:53	36.966397	-76.112199	5	4091722	400995	18S	Island1	East of island 1	Bottlenose	
32	07/06/2021	Alyssa	7/6/2021	17:01:01	36.966369	-76.11217	4	4091719	400998	18S	Island1	N of island 1	Bottlenose	
33	07/06/2021	Alyssa	7/6/2021	17:04:55	36.966373	-76.112186	4	4091719	400996	18S	Island1	NE of island 1	Bottlenose	
34	07/07/2021	Alyssa	7/7/2021	9:41:14	36.96634	-76.112208	4	4091716	400994	18S	Island1	E of island 1	Bottlenose	
35	07/07/2021	Alyssa	7/7/2021	10:10:28	36.966394	-76.11226	4	4091722	400990	18S	Island1	NE of island 1	Bottlenose	
36	07/07/2021	Alyssa	7/7/2021	10:38:16	36.966325	-76.112184	6	4091714	400996	18S	Island1	NE of island 1	Bottlenose	
37	07/09/2021	Kim Stanton	7/9/2021	11:14:37	36.96636	-76.112151	4	4091718	400999	18S	Island1	W of Island 1	Bottlenose	
38	07/12/2021	Kim Stanton	7/12/2021	13:26:47	36.966439	-76.112254	4	4091727	400990	18S	Island1	S of Island 1	Bottlenose	
39	07/12/2021	Ashley	7/12/2021	14:54:38	36.966467	-76.11221	4	4091730	400994	18S	Island1	SE of Island 1	Bottlenose	
40	07/12/2021	Kim Stanton	7/12/2021	15:33:07	36.966364	-76.112167	4	4091718	400998	18S	Island1	SE of Island 1	Bottlenose	
41	07/13/2021	Ashley	7/13/2021	9:15:00	36.966437	-76.112239	4	4091727	400992	18S	Island1	SE of Island 1	Bottlenose	
42	07/13/2021	Ashley	7/13/2021	10:12:41	36.966371	-76.11215	4	4091719	400999	18S	Island1	E of Island 1	Bottlenose	
43	07/13/2021	Kim Stanton	7/13/2021	12:26:00	36.966397	-76.112187	4	4091722	400996	18S	Island1	W of island 2	Bottlenose	
44	07/13/2021	Ashley	7/13/2021	14:25:00	36.966454	-76.112122	4	4091728	401002	18S	Island1	E of Island 1	Bottlenose	
45	07/13/2021	Kim Stanton	7/13/2021	19:46:34	36.966442	-76.112344	4	4091727	400982	18S	Island1	SW of Island 2	Bottlenose	
46	07/14/2021	Kim Stanton	7/14/2021	13:03:32	36.966378	-76.112198	4	4091720	400995	18S	Island1	W of Island 2 N or channel	Bottlenose	
47	07/20/2021	Kim Stanton	7/20/2021	8:41:22	36.966363	-76.11219	4	4091718	400996	18S	Island1	S of Island 1 in between Island and green buoy	Bottlenose	
48	07/20/2021	Ashley	7/20/2021	10:29:58	36.966364	-76.112144	4	4091718	401000	18S	Island1	Between Islands 1 and 2	Bottlenose	
49	07/23/2021	Kim Stanton	7/23/2021	10:54:03	36.966395	-76.112183	4	4091722	400997	18S	Island1	S of Island 1	Bottlenose	
50	07/24/2021	Alyssa	7/24/2021	8:27:37	36.966452	-76.11219	7	4091728	400996	18S	Island1	East of island 1	Bottlenose	
51	07/24/2021	Kim Stanton	7/24/2021	12:52:31	36.966378	-76.112189	4	4091720	400996	18S	Island1	Between Island 1 and green buoy	Bottlenose	
52	07/26/2021	Alyssa	7/26/2021	16:46:57	36.966435	-76.112239	6	4091726	400992	18S	Island1	Northeast of island 1	Bottlenose	
53	07/27/2021	Alyssa	7/27/2021	7:24:36	36.966396	-76.112178	4	4091722	400997	18S	Island1	North and northeast of island 1	Bottlenose	
54	07/27/2021	Alyssa	7/27/2021	7:46:53	36.966391	-76.112199	8	4091721	400995	18S	Island1	South of island 1	Bottlenose	
55	07/27/2021	Alyssa	7/27/2021	7:55:26	36.966394	-76.112199	5	4091722	400995	18S	Island1	East of island	Bottlenose	
56	07/27/2021	Alyssa	7/27/2021	11:06:52	36.966373	-76.112202	4	4091719	400995	18S	Island1	North of island one in channel	Bottlenose	
57	07/27/2021	Alyssa	7/27/2021	11:11:28	36.966334	-76.112162	5	4091715	400998	18S	Island1	Southeast of island 1	Bottlenose	
58	07/28/2021	Kim Stanton	7/28/2021	11:44:17	36.966389	-76.112222	4	4091721	400993	18S	Island1	Halfway between Island 1 and Island 2 in channel	Bottlenose	
59	07/28/2021	Kim Stanton	7/28/2021	12:56:59	36.966391	-76.112197	4	4091721	400995	18S	Island1	S of Island 1	Bottlenose	
60	08/05/2021	Kim Stanton	8/5/2021	14:31:02	36.966411	-76.112153	4	4091724	400999	18S	Island1	S of Island 2 towards channel	Bottlenose	
61	08/07/2021	Kim Stanton	8/7/2021	7:11:29	36.966463	-76.112186	4	4091729	400996	18S	Island1	SW of Island 1 towards channel	Bottlenose	
62	08/09/2021	Ashley	8/9/2021	14:51:27	36.966398	-76.112094	5	4091722	401004	18S	Island1	S Island 1	Bottlenose	
63	08/09/2021	Ashley	8/9/2021	14:51:27	36.966398	-76.112094	5	4091722	401004	18S	Island1	S Island 1	Bottlenose	
64	08/13/2021	Kim Stanton	8/13/2021	11:52:22	36.966385	-76.112201	4	4091721	400995	18S	Island1	S of Island in middle of channel	Bottlenose	
65	08/17/2021	Kim Stanton	8/17/2021	8:17:26	36.966339	-76.11225	4	4091716	400991	18S	Island1	S of Island 1 near rocks	Bottlenose	
66	08/17/2021	Kim Stanton	8/17/2021	8:33:46	36.966391	-76.112175	4	4091721	400997	18S	Island1	NE of Island 1	Bottlenose	
67	08/18/2021	Kim Stanton	8/18/2021	11:58:07	36.966364	-76.112196	4	4091718	400995	18S	Island1	N of Island 1 towards channel	Bottlenose	
68	08/19/2021	Alyssa	8/19/2021	7:33:05	36.966416	-76.112202	4	4091724	400995	18S	Island1	NE of island 1	Bottlenose	
69	08/19/2021	Alyssa	8/19/2021	9:38:00	36.966379	-76.112215	4	4091720	400994	18S	Island1	NE of island 1	Bottlenose	
70	08/20/2021	Alyssa	8/20/2021	7:22:00	36.966404	-76.112149	4	4091723	401000	18S	Island1	East of island 1	Bottlenose	
71	08/20/2021	Alyssa	8/20/2021	12:15:12	36.966109	-76.112322	5	4091690	400984	18S	Island1	East of island 1	Bottlenose	
72	08/20/2021	Alyssa	8/20/2021	12:20:15	36.966415	-76.112145	4	4091724	401000	18S	Island1	E of island 1	Bottlenose	
73	08/20/2021	Alyssa	8/20/2021	12:24:15	36.966407	-76.112176	5	4091723	400997	18S	Island1	E of island 1	Bottlenose	
74	08/20/2021	Alyssa	8/20/2021	16:09:36	36.966341	-76.112177	8	4091716	400997	18S	Island1	SE of island 1	Bottlenose	
75	08/24/2021	Kim Stanton	8/24/2021	10:17:57	36.966372	-76.112231	4	4091719	400992	18S	Island1	S of Island 1	Bottlenose	
76	08/26/2021	Steven	8/26/2021	8:55:27	36.966441	-76.112192	10	4091727	400996	18S	Island1	North of island 1 in channel	Bottlenose	
77	08/26/2021	Steven	8/26/2021	9:50:43	36.966468	-76.112193	10	4091730	400996	18S	Island1	North of island 1	Bottlenose	
78	08/27/2021	Alyssa	8/27/2021	11:00:22	36.966474	-76.112185	7	4091731	400996	18S	Island1	NE of island 1	Bottlenose	
79	08/27/2021	Alyssa	8/27/2021	12:02:08	36.966411	-76.112177	5	4091724	400997	18S	Island1	E of island 1	Bottlenose	
80	08/27/2021	Alyssa	8/27/2021	14:33:08	36.966463	-76.112204	9	4091729	400995	18S	Island1	E of island 1	Bottlenose	
81	09/13/2021	Alyssa	9/13/2021	12:04:46	36.966413	-76.112223	4	4091724	400993	18S	Island1	NE of Island 1	Bottlenose	
82	09/13/2021	Alyssa	9/13/2021	12:12:00	36.966407	-76.112228	5	4091723	400993	18S	Island1	NE of island 1	Bottlenose	
83	09/13/2021	Alyssa	9/13/2021	15:49:58	36.966371	-76.112143	5	4091719	401000	18S	Island1	E of island 1	Bottlenose	
84	09/15/2021	Alyssa	9/15/2021	7:04:14	36.966421	-76.112183	5	4091725	400997	18S	Island1	NE of island 1	Bottlenose	
85	09/15/2021	Alyssa	9/15/2021	8:35:19	36.966402	-76.112154	5	4091723	400999	18S	Island1	East of island 1	Bottlenose	
86	09/15/2021	Alyssa	9/15/2021	12:55:08	36.966478	-76.112287	4	4091731	400987	18S	Island1	NE of island 1	Bottlenose	
87	09/15/2021	Ashley	9/15/2021	13:29:35	36.980881	-76.106823	37	4093323	401492	18S	Island2	E of Island 2	Bottlenose	
88	09/17/2021	Kim Stanton	9/17/2021	8:31:37	36.966371	-76.112203	4	4091719	400995	18S	Island1	SE of Island 1	Bottlenose	
89	09/27/2021	Kim Stanton	9/27/2021	9:12:11	36.966384	-76.112202	4	4091721	400995	18S	Island1	S of Island 1	Bottlenose	
90	09/27/2021	Ashley	9/27/2021	16:43:32	36.966358	-76.112619	222	4091718	400958	18S	Island1	E of Island 1	Bottlenose	
91	09/30/2021	Kim Stanton	9/30/2021	14:41:59	36.966505	-76.112177	4	4091734	400997	18S	Island1	NE of Island 1	Bottlenose	
92	10/07/2021	Kim Stanton	10/7/2021	12:46:27	36.96649	-76.112208	4	4091732	400994	18S	Island1	SW of Island 1	Bottlenose	
93	10/14/2021	Alyssa	10/14/2021	13:14:22	36.966408	-76.112156	6	4091723	400999	18S	Island1	East of island 1	Bottlenose	
94	10/14/2021	Alyssa	10/14/2021	13:49:20	36.96648	-76.112212	6	4091731	400994	18S	Island1	E of island 1	Bottlenose	
95	10/21/2021	Kim Stanton	10/21/2021	11:40:54	36.96643	-76.112248	5	4091726	400991	18S	Island1	S of Island 1	Bottlenose	
96	10/21/2021	Kim Stanton	10/21/2021	11:52:16	36.966357	-76.112185	5	4091718	400996	18S	Island1	NE of Island 1	Bottlenose	
97	10/22/2021	Kim Stanton	10/22/2021	14:31:02	36.966373	-76.112217	4	4091719	400994	18S	Island1	SE of Island 1	Bottlenose	
98	10/22/2021	Ashley	10/22/2021	15:20:00	36.966654	-76.113414	830	4091752	400887	18S	Island1	NW PI 1	Bottlenose	
99	10/28/2021	Kim Stanton	10/28/2021	15:33:04	36.966513	-76.112187	4	4091735	400996	18S	Island1	NE towards channel	Bottlenose	
100	10/30/2021	Kim Stanton	10/30/2021	11:01:57	36.966549	-76.1122	5	4091739	400995	18S	Island1	S of boulders on Island 1	Other	River Otter
101	11/04/2021	Kim Stanton	11/4/2021	12:11:21	36.966516	-76.112219	4	4091735	400994	18S	Island1	S of Island 1	Bottlenose	
102	11/09/2021	Ashley	11/9/2021	13:15:00	36.96657	-76.112349	457	4091741	400982	18S	Island1	E of PI 1	Bottlenose	

ID	Sighting_Cu	Sighting_Cu	Dist_Animal	Dist_Animal_to_Pile	Animal_Hea	Behavior	Behavior_O	Behavior_C	Observed_C	Group_Size	Group_Size	Group_Size	Extrapolate	No_Calves_	Sex_of_Ani	Duplicate_Si
1	Animal itself		750	850	S	Fast				3	3	3		0	Unknown	Not a
2	Animal itself		1500	1200	S	Slow				15	25	20		2	Unknown	Not a
3	Animal itself		2000	2000	N	Slow				20	30	25		0	Unknown	Not a
4	Animal itself		200	300	E	Slow				10	20	10		0	Unknown	Not a
5	Animal itself		300	150	S	Fast				10	20	10		0	Unknown	Possibly a
6	Animal itself		250	300	SE	Slow				10	20	10		0	Unknown	Not a
7	Animal itself		1000	1250	East	Resting/Hau				20	30	25		0	Unknown	Not a
8	Animal itself		1000	1000	east	Fast				10	10	10		0	Unknown	Not a
9	Animal itself		750	1000	North	Slow				10	10	10	10	0	Unknown	Not a
10	Animal itself		600	700	West	Fast				10	10	10		0	Unknown	Not a
11	Animal itself		550	600	319°	Feeding				2	7	5		0	Unknown	Not a
12	Animal itself		500	600	192°	Slow				5	10	8		1	Unknown	Possibly a
13	Animal itself		500	550	SE, N	Feeding				6	11	9		1	Female	Not a
14	Animal itself		675	710	S, N	Feeding				10	15	13		0	Unknown	Possibly a
15	Animal itself		400	425	330°	Slow				6	11	9		0	Male	Not a
16	Blow		900	950	SE	Fast				10	15	13		0	Unknown	Not a
17	Animal itself		425	475	SE	Fast				2	2	2		0	Male	Not a
18	Animal itself		625	675	SE	Unknown				1	1	1		0	Unknown	Not a
19	Animal itself		600	650	N/NW	Slow				12	17	15		1	Unknown	Not a
20	Animal itself		600	650	East	Fast				4	9	7		1	Unknown	Not a
21	Animal itself		600	650	East	Feeding				4	9	7		0	Unknown	Not a
22	Animal itself		600	650	Heading	Fast				4	9	7		0	Unknown	Not a
23	Animal itself		800	850	East	Milling				2	7	5		0	Unknown	Possibly a
24	Animal itself		500	550	Heading	Fast				5	10	8		0	Unknown	Not a
25	Animal itself		225	275	SE	Slow				2	2	2		0	Male	Not a
26	Animal itself		700	750	Heading	Slow				2	7	5		0	Unknown	Not a
27	Animal itself		700	750	East	Slow				2	7	5		0	Unknown	Not a
28	Animal itself		225	275	West	Slow				6	11	9		0	Unknown	Possibly a
29	Animal itself		700	750	East and	Feeding				7	12	10		1	Unknown	Possibly a
30	Animal itself		300	350	N	Slow				7	12	10		2	Female	Not a
31	Animal itself		500	550	West but	Milling				2	8	6		0	Unknown	Possibly a
32	Animal itself		800	800	Heading	Fast				2	7	5		0	Unknown	Possibly a
33	Animal itself		400	450	Going in	Feeding				7	12	10		0	Unknown	Possibly a
34	Animal itself		450	500	North	Fast				7	12	10		0	Unknown	Not a
35	Animal itself		500	550	North	Slow				2	7	5		0	Unknown	Not a
36	Animal itself		500	550	NW	Slow				3	8	6		0	Unknown	Possibly a
37	Animal itself		650	750	195°	Slow				3	3	3		0	Unknown	Not a
38	Animal itself		400	450	183°	Slow				2	7	5		0	Male	Not a
39	Animal itself		1000	1050	S	Feeding				10	15	13		0	Unknown	Not a
40	Animal itself		700	750	80°	Fast				2	7	5		0	Male	Not a
41	Splash		1100	1150	NW	Slow				5	10	8		0	Unknown	Not a
42	Animal itself		650	700	SE	Slow				5	10	8		0	Unknown	Possibly a
43	Animal itself		1750	1725	315°	Slow				13	18	16		0	Unknown	Not a
44	Animal itself		550	600	E	Slow				2	2	2		0	Male	Not a
45	Animal itself		1500	1550	All	Feeding				10	15	12		0	Unknown	Not a
46	Animal itself		1750	1745	315°	Fast				4	9	7		0	Unknown	Not a
47	Animal itself		425	440	90°	Feeding				6	11	9		0	Unknown	Not a
48	Animal itself		350	400	E	Slow				15	20	18		0	Unknown	Not a
49	Animal itself		2000	2025	120°	Slow				2	2	2		0	Male	Not a
50	Animal itself		750	775	South east	Slow				2	10	5		0	Unknown	Not a
51	Animal itself		500	525	5°	Slow				5	10	8		0	Unknown	Not a
52	Animal itself		750	775	South	Slow				2	7	5		0	Unknown	Not a
53	Animal itself		800	825	East	Fast				6	10	8		0	Unknown	Not a
54	Animal itself		500	550	Southwest	Feeding				1	3	2		0	Unknown	Not a
55	Animal itself		250	300	East	Milling				3	5	3		0	Unknown	Not a
56	Animal itself		300	300	East	Slow				3	8	5		0	Unknown	Possibly a
57	Animal itself		700	750	North	Feeding				6	11	10		0	Unknown	Not a
58	Animal itself		1000	1015	325°	Fast				5	10	8		1	Female	Not a
59	Animal itself		1500	1575	95°	Socializing				3	8	6		0	Unknown	Not a
60	Animal itself		600	615	300°	Fast				6	11	9		0	Unknown	Not a
61	Animal itself		400	415	324°	Feeding				6	11	9		2	Unknown	Not a
62	Animal itself		500	515	90°	Fast				1	6	4		0	Unknown	Not a
63	Animal itself		500	515	90°	Fast				1	6	4		0	Unknown	Not a
64	Animal itself		850	860	114°	Feeding				6	11	9		0	Unknown	Not a
65	Animal itself		300	315	178°	Fast				5	10	8		0	Unknown	Not a
66	Animal itself		300	315	123°	Fast				3	8	6		0	Male	Not a
67	Animal itself		300	315	107°	Fast				6	11	9		3	Female	Not a
68	Animal itself		650	675	South	Feeding				1	6	4		0	Unknown	Not a
69	Animal itself		350	375	West	Milling				1	6	3		0	Unknown	Possibly a
70	Animal itself		100	125	East	Milling				2	8	5		0	Unknown	Not a
71	Animal itself		700	725	East	Slow				4	9	6		1	Unknown	Not a
72	Animal itself		800	825	East	Slow				10	15	12		0	Unknown	Not a
73	Animal itself		250	275	North	Milling				2	7	4		0	Unknown	Not a
74	Animal itself		800	825	North	Feeding				3	7	5		0	Unknown	Not a
75	Animal itself		300	315	142°	Fast				6	11	9		0	Unknown	Not a
76	Animal itself		500	400	97°	Fast				3	8	6		0	Male	Not a
77	Animal itself		1000	900	097°	Milling				5	10	8		0	Male	Not a
78	Animal itself		850	900	West	Feeding				5	10	7		0	Unknown	Not a
79	Animal itself		300	400	North	Slow				1	4	2		0	Unknown	Not a
80	Animal itself		300	400	North	Fast				7	12	10		0	Unknown	Not a
81	Animal itself		400	500	West	Slow				2	6	7		0	Unknown	Not a
82	Animal itself		850	950	East of the	Feeding				5	10	8		0	Unknown	Not a
83	Animal itself		500	600	North	Slow				4	8	6		0	Unknown	Not a
84	Animal itself		500	600	Circling to	Feeding				10	20	15		0	Unknown	Not a
85	Animal itself		900	1000	South	Slow				5	10	7		0	Unknown	Not a
86	Animal itself		500	600	East	Fast				3	9	5		0	Unknown	Not a
87	Animal itself		400	425	E	Feeding				20	25	23		0	Unknown	Not a
88	Animal itself		425	600	S	Feeding				2	7	5		0	Unknown	Not a
89	Animal itself		300	600	192°	Milling				5	10	8		0	Unknown	Not a
90	Animal itself		500	550	NW	Fast				6	11	9		0	Unknown	Not a
91	Animal itself		400	300	148°	Feeding				2	7	5		0	Male	Not a
92	Animal itself		500	600	172°	Fast				2	7	5		0	Unknown	Not a
93	Animal itself		800	850	West	Feeding				3	8	5		0	Unknown	Not a
94	Animal itself		500	550	NW	Milling				1	5	3		0	Unknown	Possibly a
95	Animal itself		500	700	216°	Fast				2	7	5		0	Male	Not a
96	Animal itself		700	600	143°	Slow				6	11	9		0	Unknown	Not a
97	Animal itself		500	600	310°	Milling				4	9	7		0	Male	Not a
98	Animal itself		225	275	N	Fast				5	10	8		0	Unknown	Not a
99	Animal itself		500	400	125°	Fast				4	9	7		0	Male	Not a
100	Animal itself		50	50	36°	Slow				1	1	1		0	Unknown	Not a
101	Animal itself		50	150	18°	Slow				2	7	5		0	Male	Not a
102	Animal itself		700	750	E	Fast				4	9	7		0	Unknown	Not a

ID	Construction_Act	Pile_Type	Ani_in_Whi	Number_An	Mitigation_	Mitigation_	Total_Down	Beaufort_Se	Swell_Heigh	Swell_Direct	Visibility	Percent_Ob	Weather_Co	Human_Acti	Describe_Ac	Photograph
1	No Pile Driving							0 - Calm	Light 0 - 3 ft	Southwest	Excellent	10 - 25 %	Sunny	None		No
2	Down-the-hole (DTH) Drilling		Outside	20	No			2 - Light	Light 0 - 3 ft	Southwest	Excellent	Less than 10	Sunny	Fishing		No
3	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southwest	Good (10-	Less than 10	Mostly	Commercial		No
4	No Pile Driving							3 - Gentle	Light 0 - 3 ft	Southwest	Excellent	Less than 10	Sunny	Military		No
5	No Pile Driving							3 - Gentle	Light 0 - 3 ft	Southwest	Excellent	Less than 10	Sunny	None		No
6	No Pile Driving							2 - Light	Light 0 - 3 ft	Northwest	Good (10-	Less than 10	Mostly	None		No
7	No Pile Driving							1 - Light air	Light 0 - 3 ft	Northwest	Good (10-	Less than 10	Mostly	None		No
8	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	South	Good (10-	Less than 10	Sunny	None		No
9	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southwest	Good (10-	Less than 10	Sunny	None		No
10	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	North	Good (10-	Less than 10	Sunny	Fishing		No
11	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	10 - 25 %	Partly	Fishing		No
12	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Partly	None		No
13	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	None		No
14	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	None		No
15	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	6	No			1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	None		No
16	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	None		No
17	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	None		No
18	No Pile Driving							1 - Light air	Light 0 - 3 ft	Northeast	Excellent	Less than 10	Sunny	None		No
19	No Pile Driving							1 - Light air	Light 0 - 3 ft	Northeast	Excellent	Less than 10	Partly	None		No
20	No Pile Driving							1 - Light air	Light 0 - 3 ft	North	Good (10-	10 - 25 %	Sunny	None		No
21	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southwest	Good (10-	10 - 25 %	Sunny	Recreational		No
22	No Pile Driving							1 - Light air	Light 0 - 3 ft	North	Good (10-	10 - 25 %	Sunny	None		No
23	No Pile Driving							1 - Light air	Light 0 - 3 ft	West	Good (10-	10 - 25 %	Sunny	Recreational		No
24	Impact Pile Driving	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	West	Good (10-	10 - 25 %	Sunny	None		No
25	Impact Pile Driving	Steel 36 inch	Shutdown	2	No			2 - Light	Light 0 - 3 ft	Northeast	Excellent	Less than 10	Sunny	None		No
26	Impact Pile Driving	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	West	Good (10-	25% to 50%	Sunny	None		No
27	Impact Pile Driving	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	West	Good (10-	25% to 50%	Sunny	None		No
28	No Pile Driving							1 - Light air	Light 0 - 3 ft	West	Good (10-	25% to 50%	Sunny	Recreational		No
29	No Pile Driving							1 - Light air	Light 0 - 3 ft	West	Good (10-	Less than 10	Sunny	None		No
30	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	North	Excellent	Less than 10	Sunny	None		No
31	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	West	Good (10-	Less than 10	Sunny	Recreational		No
32	Impact Pile Driving	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	West	Good (10-	Less than 10	Sunny	None		No
33	Impact Pile Driving	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	West	Good (10-	Less than 10	Sunny	None		No
34	No Pile Driving							1 - Light air	Light 0 - 3 ft	East	Good (10-	25% to 50%	Sunny	Fishing		No
35	No Pile Driving							1 - Light air	Light 0 - 3 ft	West	Good (10-	25% to 50%	Sunny	None		No
36	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	West	Good (10-	10 - 25 %	Sunny	None		No
37	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	Fishing		No
38	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	Fishing		No
39	No Pile Driving							1 - Light air	Light 0 - 3 ft	South	Excellent	Less than 10	Sunny	None		Yes
40	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	Fishing		Yes
41	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southwest	Excellent	10 - 25 %	Sunny	None		Yes
42	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southwest	Excellent	Less than 10	Sunny	None		No
43	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	Fishing		No
44	Impact Pile Driving	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	South	Excellent	Less than 10	Partly	None		Yes
45	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Mostly	Fishing		No
46	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	Fishing		No
47	No Pile Driving							2 - Light	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Mostly	Fishing		Yes
48	No Pile Driving							1 - Light air	Light 0 - 3 ft	East	Good (10-	Less than 10	Mostly	Fishing		Yes
49	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	Military		Yes
50	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	25% to 50%	Sunny	Fishing		No
51	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Mostly	Fishing		Yes
52	No Pile Driving							0 - Calm	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Mostly	None		No
53	No Pile Driving							0 - Calm	Light 0 - 3 ft	Northeast	Good (10-	10 - 25 %	Partly	None		No
54	No Pile Driving							0 - Calm	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Partly	None		No
55	No Pile Driving							0 - Calm	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	None		No
56	No Pile Driving							0 - Calm	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	None		No
57	No Pile Driving							0 - Calm	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	None		No
58	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Partly	Fishing		Yes
59	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Moderate	Less than 10	Mostly	Military		Yes
60	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			2 - Light	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	None		No
61	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Poor (0.5 -	Less than 10	Light Rain	None		Yes
62	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			0 - Calm	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	Fishing		No
63	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			0 - Calm	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	Fishing		No
64	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	Fishing		No
65	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Mostly	None		No
66	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Mostly	None		No
67	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Mostly	None		No
68	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	10 - 25 %	Partly	None		No
69	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	25% to 50%	Partly	None		No
70	No Pile Driving							0 - Calm	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Mostly	None		No
71	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Mostly	None		No
72	No Pile Driving							0 - Calm	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Mostly	None		No
73	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Mostly	None		No
74	Impact Pile Driving	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Partly	None		No
75	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	None		No
76	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southeast	Excellent	10 - 25 %	Partly	Military		No
77	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	Fishing		No
78	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	10 - 25 %	Sunny	None		No
79	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Sunny	Fishing		No
80	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Sunny	None		No
81	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			2 - Light	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Partly	None		No
82	Down-the-hole (DTH) Drilling		Outside	0	No			2 - Light	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Sunny	None		No
83	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Sunny	Fishing		No
84	No Pile Driving							2 - Light	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Sunny	None		No
85	No Pile Driving							2 - Light	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Sunny	None		No
86	No Pile Driving							2 - Light	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Sunny	Fishing		No
87	No Pile Driving							2 - Light	Light 0 - 3 ft	Northeast	Excellent	Less than 10	Partly	Other		No
88	No Pile Driving							2 - Light	Moderate 4 -	East	Good (10-	Less than 10	Mostly	None		No
89	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	10 - 25 %	Sunny	None		No
90	No Pile Driving							1 - Light air	Light 0 - 3 ft	West	Excellent	Less than 10	Sunny	None		No
91	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	Fishing		No
92	No Pile Driving							2 - Light	Moderate 4 -	Northeast	Excellent	Less than 10	Mostly	None		No
93	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Partly	None		No
94	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Good (10-	Less than 10	Partly	None		No
95	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southwest	Excellent	Less than 10	Partly	Fishing		No
96	Impact Pile Driving	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southwest	Excellent	Less than 10	Partly	Fishing		No
97	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Mostly	None		No
98	No Pile Driving							2 - Light	Light 0 - 3 ft	Northwest	Excellent	Less than 10	Partly	None		No
99	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			2 - Light	Moderate 4 -	Northeast	Excellent	Less than 10	Partly	None		No
100	No Pile Driving							1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Partly	None		no
101	No Pile Driving							2 - Light	Light 0 - 3 ft	South	Excellent	Less than 10	Mostly	None		No
102	Down-the-hole (DTH) Drilling	Steel 36 inch	Outside	0	No			1 - Light air	Light 0 - 3 ft	Southeast	Excellent	Less than 10	Sunny	None		No

ID	Frame_No_Descr	End_Time	Notes	
1		8:06:00		
2		13:40:00	Driving over boulders, ie land, no mitigation necessary at this time	
3		9:40:00	Following wake of cargo ship	
4		11:26:00	No in water work, no mitigation necessary	
5		10:49:00	No in water work, no mitigation necessary	
6		8:11:00	No water work, no mitigation necessary	
7		11:06:00	Viewed two groups likely from the same pod moving slowly in a circle lular	
8		13:17:00	Dolphins seen swimming quickly east, away from construction. Noted them near	
9		14:50:00	Small group of dolphins	
10		19:00:00	Dolphins traveled about 500 meters from east to west as observed, coming	
11		9:46:00		
12		11:24:00		
13		11:20:00	No in water work, no mitigation necessary; dolphins milled around buoys S of	
14		12:27:00	No in water work, no mitigation necessary	
15		17:31:00	Pod came close to mitigation zone traveling N past trestle. No in-water work	
16		9:16:00		
17		13:11:00		
18		14:33:00	Subadult Loggerhead surfaced twice within 2 min.	
19		15:40:00	Subadult Loggerhead also seen in same immediate area as dolphin pod.	
20		9:16:00	4 view dolphins moving with purpose to the east	
21		9:56:00	Small group heading east. Observer tail slapping.	
22		10:03:00	Group heading east over tunnel	
23		10:12:00	At least 2 dolphins spotted. Could have been part of an earlier seen group that	
24		11:03:00	Small group moving east during pile driving. Lots of bird activity.	
25		11:07:00	No in water work, no mitigation necessary	
26		11:10:00	Dolphins were first seen swimming south but then went east away from	
27		11:25:00	Heading east	
28		12:07:00	Group of animals came from west. Unsure if they were a group that circled back.	
29		15:15:00	Two small groups merged. Ate together. Stayed in our sight for a long period.	
30		15:52:00	No in water work, no mitigation necessary	
31		16:01:00	Dolphins swam toward the 1st island during down in the hole. Swam around.	
32		17:02:00	Dolphins heading over tunnel toward impact hammer sound	
33		17:30:00	This group stayed offthe NE corner of the 1st island throughout the whole	
34		9:55:00	Pod of dolphins swam from south to north; they jumped out of the water as the	
35		10:12:00	Group appeared and disappeared quickly	
36		10:41:00	Brief sighting	
37		11:17:00		
38		13:29:00		
39	Bottlenose dolphin_07-12-	15:11:00		
40	Bottlenose dolphin_07-12-	15:35:00		
41	Bottlenose dolphin_07-13-	9:34:00	Started SE of Island 1, slowly traveled through channel	
42		10:15:00		
43		12:28:00		
44	Bottlenose dolphin_07-13-	14:35:00		
45		19:51:00		
46		13:06:00		
47	Bottlenose dolphin_07-20-	8:50:00		
48	Bottlenose dolphin_07-20-	10:34:00		
49	Bottlenose dolphin_07-23-	10:58:00		
50		8:34:00	One/maybe two dolphins spotted	
51	Bottlenose dolphin_07-24-	12:55:00		
52		16:50:00	A few dolphins noted traveling	
53		7:27:00	Group fast traveling.	
54		7:48:00		
55		8:23:00		
56		11:10:00	Small group traveling east over channel	
57		12:00:00	Larger group that traveled from the middle of bridge up past the shipping	
58	Bottlenose dolphin_07-28-	11:46:00		
59	Bottlenose dolphin_07-28-	13:00:00		
60		14:36:00		
61	Bottlenose dolphin_08-07-	7:14:00		
62		14:53:00		
63		14:53:00		
64		12:00:00		
65		8:22:45		
66		8:36:12		
67		12:00:00		
68		7:40:00	One identified for sure. Came within 200 m of islands	
69		11:00:00	Dolphins feeding around space in between tunnels	
70		7:48:00		
71		12:20:00	Larger group with what appeared to be a calf based on size and closeness to	
72		13:05:00	The largest group seen to date traveling together	
73		12:25:00		
74		17:00:00	Animals moved into area to closer to the pile driving and fed 300 m from the	
75		10:20:00		
76		9:14:00	Accuracy 10	
77		10:00:00	Accuracy 10	
78		12:20:00	Traveling west. Ended up closer to navigational buoys and headed back west.	
79		12:06:00		
80		14:38:00	Animals traveled from the E side of Island 1 across the channel then headed	
81		12:12:00	Small group heading west over tunnel	Begin in-
82		12:18:00	Group active to the east of the green buoy	Begin in-
83		15:55:00		Begin in-
84		13:00:00	Large group started out relatively close to the tunnel,and traveled East.	
85		9:00:00	Group appearing to swim around to eat	
86		14:30:00		
87		13:50:00	No mitigation necessary; GPS accuracy off	
88		8:39:00		
89		9:29:00		
90		16:49:00	GPS accuracy off	
91		14:43:00		
92		12:52:00		
93		13:16:00		
94		13:50:00		
95		11:43:00		
96		11:57:00	Impact driving with bubble curtain. No level B harassment zone with bubble	
97		14:33:00		
98		15:26:00		
99		15:37:00		
100		11:30:00		
101		12:15:00		
102		13:21:00	DTH WW, no mitigation necessary; GPS accuracy off	

APPENDIX C-

Observed Species Log

Date Observed:	Time	Beaufort Sea State	Swell Height (ft.)	Swell Direction	Visibility	Percent OBS Glare	Weather conditions	Island:	Pile Driving Activity During Observation:	Construction Activity	Pile Size:	Bubble Curtain:	Species Observed:	Quatity of Mammals Observed:	No. of Calves	Sex Class	Mammal Behavior	Mammal Distance From Driving Activity (m):	Level A or B Take:	Shutdown:	Reason:
3/9/2021	12:25	1	0.3	W	Good	N/A	Partly Cloudy	2	None	Trestle	N/A	YES	Harbor Seal	2	0	Unkown	Swimming by rocks	150	None	No	No pile driving activity taking place during mammal observation
3/9/2021	15:10	1	0.3	w	Good	N/A	Sunny	2	Impact	Trestle	36" Steel Pipe Pile	YES	Harbor Seal	1	0	Unkown	Swimming by rocks	60	A	No	Level A is 535 meters for Impact w/ Bubble Curtain for Seals
3/11/2021	7:25	3	0.3	W	Good	N/A	Partly Cloudy	2	Impact	Trestle	36" Steel Pipe Pile	YES	Harbor Seal	1	0	Unkown	Swimming by rocks	80	A	No	Level A is 535 meters for Impact w/ Bubble Curtain for Seals
3/11/2021	10:02	2	0.3	W	Good	NA	Partly Cloudy	2	None	Trestle	N/A	YES	Harbor Seal	2	0	Unkown	Milling by rocks	80	None	No	No pile driving activity taking place during mammal observation
6/7/2021	8:05	0	0-3	SW	Excellent	10-25	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	3	0	Unkown	Fast traveling SE of island	850	None	No	No pile driving activity taking place during mammal observation
6/7/2021	13:38	2	0-3	SW	Excellent	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 18E	-	NO	Bottlenose Dolphin	20	2	Male	Slow Traveling NW of Island	1200	None	No	Level B ZOI is 215 meters for DTH
6/8/2021	13:20	1	0-3	SW	Excellent	<10	Partly Cloudy	1	Impact	Berm Construction East Wall - Pile 19 E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	4	0	Unkown	Feeding S of Island	750	None	No	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
6/10/2021	9:38	1	0-3	SW	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	25	0	Unkown	Slow Traveling N of Island	2000	None	No	No pile driving activity taking place during mammal observation
6/16/2021	10:43	1	0-3	SW	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	10	0	Unkown	Slow Traveling S of Island	300	None	No	No pile driving activity taking place during mammal observation
6/16/2021	11:24	1	0-3	SW	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	10	0	Unkown	Fast Traveling S of Island	150	None	No	No pile driving activity taking place during mammal observation
6/21/2021	8:05	2	0-3	NW	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	10	0	Unkown	Slow raveling E of Island	300	None	No	No pile driving activity taking place during mammal observation
6/21/2021	10:53	1	0-3	NW	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	25	0	Unkown	Resting S of Island	1250	None	No	No pile driving activity taking place during mammal observation
6/21/2021	13:13	1	0-3	SW	Good	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - 26E	42" Steel	NO	Bottlenose Dolphin	10	0	Unkown	Fast raveling NE of Island	1000	None	No	Level B ZOI is 215 meters for DTH
6/21/2021	14:46	1	0-3	SW	Good	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	10	0	Unkown	Slow Traveling E of Island	1000	None	No	No pile driving activity taking place during mammal observation
6/21/2021	18:49	1	0-3	N	Good	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 26E	42" Steel	NO	Bottlenose Dolphin	10	0	Unkown	Fast traveling NE of Island	700	None	No	Level B ZOI is 215 meters for DTH
6/28/2021	9:45	1	0-3	SE	Good	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Feeding NE of Island	600	None	No	No pile driving activity taking place during mammal observation
6/28/2021	11:03	1	0-3	SE	Good	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	8	1	Unkown	Slow Traveling SE of Island	500	None	No	No pile driving activity taking place during mammal observation
6/29/2021	17:42	0	0-3	SE	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	7	1	Female	Slow Traveling N of Island	750	None	No	No pile driving activity taking place during mammal observation
6/30/2021	11:04	1	0-3	SE	Excellent	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 24E	36" Steel Pile	NO	Bottlenose Dolphin	9	1	Female	Feeding SE of island	550	None	No	Level B ZOI is 215 meters for DTH
6/30/2021	12:22	1	0-3	SE	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	13	0	Unkown	Feeding SE of island	675	None	No	No pile driving activity taking place during mammal observation
6/30/2021	17:25	1	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	9	0	Male	Slow Traveling NE of Island	400	None	No	No pile driving activity taking place during mammal observation
7/1/2021	9:10	1	0-3	SE	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	13	0	Unkown	Fast Traveling S of Island	950	None	No	No pile driving activity taking place during mammal observation
7/1/2021	13:05	1	0-3	SE	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	2	0	Male	Fast Traveling S of Island	475	None	No	No pile driving activity taking place during mammal observation
7/1/2021	14:29	1	0-3	NE	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Loggerhead Turtle	1	0	Unkown	Unkown	675	None	No	No pile driving activity taking place during mammal observation
7/1/2021	12:25	1	0-3	NE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	15	1	Unkown	Slow Traveling SE of Island	650	None	No	No pile driving activity taking place during mammal observation
7/6/2021	9:10	1	0-3	N	Good	10-25	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	7	1	Unkown	Fast Traveling E of Island	650	None	No	No pile driving activity taking place during mammal observation
7/6/2021	9:50	1	0-3	SW	Good	10-25	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 35E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	7	0	Unkown	Feeding E of Island	650	None	No	Level B ZOI is 215 meters for DTH
7/6/2021	9:56	1	0-3	N	Good	10-25	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	7	0	Unkown	Fast Traveling E of Island	650	None	No	No pile driving activity taking place during mammal observation
7/6/2021	10:09	1	0-3	W	Good	1025	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Milling E of Island	850	None	No	No pile driving activity taking place during mammal observation
7/6/2021	10:58	1	0-3	W	Good	10-25	Sunny	1	Impact Hammer	Berm Construction East Wall - Pile 35E	36" Steel Pipe Pile	YES	Bottlenose Dolphin	8	0	Unkown	Fast Traveling E of Island	550	None	No	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
7/6/2021	11:04	2	0-3	NE	Excellent	<10	Sunny	1	Impact Hammer	Berm Construction East Wall - Pile 35E	36" Steel Pipe Pile	YES	Bottlenose Dolphin	2	0	Male	Slow Traveling N of Island	275	B	Yes	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
7/6/2021	11:04	1	0-3	W	Good	25-50	Sunny	1	Impact Hammer	Berm Construction East Wall - Pile 35E	36" Steel Pipe Pile	YES	Bottlenose Dolphin	5	0	Unkown	Slow Traveling N of Island	750	None	No	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
7/6/2021	11:22	1	0-3	W	Good	25-50	Sunny	1	Impact Hammer	Berm Construction East Wall - Pile 35E	36" Steel Pipe Pile	YES	Bottlenose Dolphin	5	0	Unkown	Slow Traveling E of Island	750	None	No	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
7/6/2021	12:03	1	0-3	W	Good	25-50	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	9	0	Unkown	Slow Traveling E of Island	275	None	No	No pile driving activity taking place during mammal observation
7/6/2021	15:05	1	0-3	W	Good	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	10	1	Unkown	Feeding NE of Island	750	None	No	No pile driving activity taking place during mammal observation
7/6/2021	15:40	1	0-3	N	Excellent	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 36E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	10	2	Female	Slow Traveling NW of island	350	None	No	Level B ZOI is 215 meters for DTH
7/6/2021	15:54	1	0-3	W	Good	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 36E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	6	0	Unkown	Milling E of Island	550	None	No	Level B ZOI is 215 meters for DTH
7/6/2021	17:01	1	0-3	W	Good	<10	Sunny	1	Impact Hammer	Berm Construction East Wall - Pile 36E	N/A	YES	Bottlenose Dolphin	5	0	Unkown	Fast Traveling N of Island	800	None	No	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
7/6/2021	17:04	1	0-3	W	Good	<10	Sunny	1	Impact Hammer	Berm Construction East Wall - Pile 36E	N/A	YES	Bottlenose Dolphin	10	0	Unkown	Feeding NE of Island	450	B	No	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
7/7/2021	9:41	1	0-3	E	Good	25-50	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	10	0	Unkown	Fast Traveling E of Island	500	None	No	No pile driving activity taking place during mammal observation
7/7/2021	10:10	1	0-3	W	Good	25-50	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Slow Traveling NE of Island	550	None	No	No pile driving activity taking place during mammal observation
7/7/2021	10:38	1	0-3	W	Good	10-25	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 37E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	6	0	Unkown	Slow Traveling NE of Island	550	None	No	Level B ZOI is 215 meters for DTH
7/9/2021	11:14	1	0-3	SE	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	3	0	Unkown	Slow Traveling W of Island	650	None	No	No pile driving activity taking place during mammal observation
7/12/2021	13:26	1	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Male	Fast traveling SE of island	750	None	No	No pile driving activity taking place during mammal observation
7/12/2021	14:54	1	0-3	S	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	13	0	Male	Feeding SE of island	1050	None	No	No pile driving activity taking place during mammal observation
712/2021	13:26	1	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Male	Slow Traveling S of Island	450	None	No	No pile driving activity taking place during mammal observation
7/13/2021	9:15	1	0-3	SW	Excellent	10-25	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	8	0	Unkown	Slow Traveling SE of Island	1100	None	No	No pile driving activity taking place during mammal observation
7/13/2021	10:12	1	0-3	SW	Excellent	<10	Sunny	1	Impact Hammer	Berm Construction East Wall	36" Steel Pipe Pile	YES	Bottlenose Dolphin	8	0	Unkown	Slow Traveling E of Island	700	None	No	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
7/13/2021	12:26	1	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	16	0	Unkown	Slow Traveling W of Island	1725	None	No	No pile driving activity taking place during mammal observation
7/13/2021	14:25	1	0-3	S	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	2	0	Male	Slow Traveling E of Island	600	None	No	No pile driving activity taking place during mammal observation
7/13/2021	19:46	1	0-3	SE	Excellent	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	12	0	Unkown	Feeding SW of island	1550	None	No	No pile driving activity taking place during mammal observation
7/14/2021	13:03	1	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	7	0	Unkown	Fast Traveling W of Island	1745	None	No	No pile driving activity taking place during mammal observation
7/20/2021	8:41	1	0-3	SE	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	9	0	Unkown	Feeding S of island	400	None	No	No pile driving activity taking place during mammal observation
7/20/2021	10:29	2	0-3	E	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	18	0	Unkown	Slow traveling between islands	400	None	No	No pile driving activity taking place during mammal observation
7/23/2021	10:54	1	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	2	0	Male	Slow Traveling S of Island	1250	None	No	No pile driving activity taking place during mammal observation
7/24/2021	8:27	1	0-3	SE	Good	25-50	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Slow raveling E of Island	775	None	No	No pile driving activity taking place during mammal observation
7/24/2021	12:52	1	0-3	SE	Excellent	<10	Mostly Cloudy	1	DTH Hammer	Berm Construction East Wall - Pile 43E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	8	0	Unkown	Slow traveling between islands	525	None	No	Level B ZOI is 215 meters for DTH
7/26/2021	16:46	0	0-3	SE	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Slow Traveling NE of Island	775	None	No	No pile driving activity taking place during mammal observation
7/27/2021	7:24	0	0-3	NE	Good	10-25	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	8	0	Unkown	Fast Traveling N of Island	825	None	No	No pile driving activity taking place during mammal observation
7/27/2021	7:46	0	0-3	SE	Good	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	2	0	Unkown	Feeding S of Island	550	None	No	No pile driving activity taking place during mammal observation

7/27/2021	7:55	0	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	3	0	Unkown	Milling E of Island	300	None	No	No pile driving activity taking place during mammal observation
7/27/2021	11:06	0	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Slow Traveling N of Island	300	None	No	No pile driving activity taking place during mammal observation
7/27/2021	11:11	0	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	10	0	Unkown	Feeding SE of island	750	None	No	No pile driving activity taking place during mammal observation
7/28/2021	11:44	1	0-3	SE	Good	<10	Partly Cloudy	1	DTH Hammer	Berm Construction East Wall - Pile 45E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	8	1	Female	Fast Traveling Between Islands	1015	None	No	No pile driving activity taking place during mammal observation
7/28/2021	12:56	1	0-3	SE	Moderate	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	6	0	Unkown	Socializing S of Island	1575	None	No	No pile driving activity taking place during mammal observation
8/5/2021	14:31	2	0-3	SE	Excellent	<10	Partly Cloudy	1	DTH Hammer	Berm Construction East Wall - Pile 50E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	9	0	Unkown	Fast Traveling S of Island	615	None	No	Level B ZOI is 215 meters for DTH
8/7/2021	7:11	1	0-3	SE	Poor	<10	Light Rain	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	9	2	Unkown	Feeding SW of island	415	None	No	No pile driving activity taking place during mammal observation
8/9/2021	14:51	0	0-3	SE	Excellent	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 55E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	4	0	Unkown	Fast Traveling S of Island	515	None	No	Level B ZOI is 215 meters for DTH
8/13/2021	11:52	1	0-3	SE	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	9	0	Unkown	Feeding S of Island	860	None	No	No pile driving activity taking place during mammal observation
8/17/2021	8:17	1	0-3	SE	Excellent	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	6	0	Male	Fast Traveling S of Island	315	None	No	No pile driving activity taking place during mammal observation
8/17/2021	8:33	1	0-3	SE	Excellent	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	8	0	Unkown	Fast raveling NE of Island	315	None	No	No pile driving activity taking place during mammal observation
8/18/2021	11:58	1	0-3	SE	Excellent	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	9	3	Female	Fast Traveling N of Island	315	None	No	No pile driving activity taking place during mammal observation
8/19/2021	7:33	1	0-3	SE	Good	10-25	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	4	0	Unkown	Feeding NE of Island	675	None	No	No pile driving activity taking place during mammal observation
8/19/2021	9:38	1	0-3	SE	Good	25-50	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	3	0	Unkown	Milling NE of Island	375	None	No	No pile driving activity taking place during mammal observation
8/20/2021	7:22	0	0-3	SE	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Milling E of Island	125	None	No	No pile driving activity taking place during mammal observation
8/20/2021	12:15	1	0-3	SE	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	6	1	Unkown	Slow Traveling E of Island	725	None	No	No pile driving activity taking place during mammal observation
8/20/2021	12:20	0	0-3	SE	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	12	0	Unkown	Slow Traveling E of Island	825	None	No	No pile driving activity taking place during mammal observation
8/20/2021	12:24	1	0-3	SE	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	4	0	Unkown	Milling E of Island	275	None	No	No pile driving activity taking place during mammal observation
8/20/2021	16:09	1	0-3	SE	Good	<10	Partly Cloudy	1	Impact Hammer	Berm Construction East Wall - Pile 61E	36" Steel Pipe Pile	YES	Bottlenose Dolphin	5	0	Unkown	Feeding SE of island	825	None	No	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
8/24/2021	10:17	1	0-3	SE	Excellent	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 66E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	9	0	Unkown	Fast Traveling S of Island	315	None	No	Level B ZOI is 215 meters for DTH
8/26/2021	8:55	1	0-3	SE	Excellent	10-25	Partly Cloudy	1	DTH Hammer	Berm Construction East Wall Pile 70E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	6	0	Male	Fast Traveling N of Island	400	None	No	Level B ZOI is 215 meters for DTH
8/26/2021	9:50	1	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	8	0	Male	Milling N of Island	900	None	No	No pile driving activity taking place during mammal observation
8/27/2021	11:00	1	0-3	SE	Good	10-25	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	7	0	Unkown	Feeding NE of Island	900	None	No	No pile driving activity taking place during mammal observation
8/27/2021	12:02	1	0-3	SE	Good	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 74E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	2	0	Unkown	Slow Traveling E of Island	400	None	No	Level B ZOI is 215 meters for DTH
8/27/2021	14:33	1	0-3	SE	Good	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	10	0	Unkown	Fast Traveling E of Island	400	None	No	No pile driving activity taking place during mammal observation
9/8/2021	9:50	1	0-3	SE	Excellent	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	6	0	Male	Fast traveling SE of island	690	None	No	No pile driving activity taking place during mammal observation
9/13/2021	12:04	2	0-3	SE	Good	<10	Partly Cloudy	1	DTH Hammer	Berm Construction East Wall - Pile 86E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	7	0	Unkown	Slow Traveling NE of Island	500	None	No	Level B ZOI is 215 meters for DTH
9/13/2021	12:12	2	0-3	SE	Good	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 86E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	8	0	Unkown	Feeding NE of Island	950	None	No	Level B ZOI is 215 meters for DTH
9/13/2021	15:49	1	0-3	SE	Good	<10	Sunny	1	DTH Hammer	Berm Construction East Wall - Pile 86E	36" Steel Pipe Pile	NO	Bottlenose Dolphin	6	0	Unkown	Slow Traveling E of Island	600	None	No	Level B ZOI is 215 meters for DTH
9/14/2021	8:47	1	0-3	SE	Excellent	25-50	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	14	0	Unkown	Feeding S of Island	1090	None	No	No pile driving activity taking place during mammal observation
9/15/2021	7:04	2	0-3	SE	Good	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	15	0	Unkown	Feeding NE of Island	600	None	No	No pile driving activity taking place during mammal observation
9/15/2021	8:35	2	0-3	SE	Good	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	7	0	Unkown	Slow Traveling E of Island	1000	None	No	No pile driving activity taking place during mammal observation
9/15/21	1/0/00	2	0-3	SE	Good	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Fast traveling NE of Island	600	None	No	No pile driving activity taking place during mammal observation
9/15/2021	13:29	2	0-3	NE	Excellent	<10	Partly Cloudy	2	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	23	0	Unkown	Feeding E of island	425	None	No	No pile driving activity taking place during mammal observation
9/17/2021	8:31	2	4-6	E	Good	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Feeding SE of island	600	None	No	No pile driving activity taking place during mammal observation
9/27/2021	9:12	1	0-3	SE	Excellent	10-25	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	8	0	Unkown	Milling S of Island	600	None	No	No pile driving activity taking place during mammal observation
9/27/2021	16:43	1	0-3	W	Excellent	<10	Sunny	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	9	0	Unkown	Fast Traveling E of Island	550	None	No	No pile driving activity taking place during mammal observation
9/30/2021	14:41	1	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Male	Feeding NE of Island	300	None	No	No pile driving activity taking place during mammal observation
10/7/2021	12:46	2	4-6	NE	Excellent	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Fast Traveling SW of Island	600	None	No	No pile driving activity taking place during mammal observation
10/14/2021	13:14	1	0-3	SE	Good	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Unkown	Feeding E of Island	850	None	No	No pile driving activity taking place during mammal observation
10/14/2021	13:49	1	0-3	SE	Good	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	3	0	Unkown	Milling E of Island	500	None	No	No pile driving activity taking place during mammal observation
10/21/2021	11:40	1	0-3	SW	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Male	Fast Traveling S of Island	700	None	No	No pile driving activity taking place during mammal observation
10/21/2021	11:52	1	0-3	SW	Excellent	<10	Partly Cloudy	1	Impact	Berm Construction on East wall - Pile 106E and 25W	36" steel	NO	Bottlenose Dolphin	9	0	Unkown	Slow Traveling NE of island	600	None	No	Level B ZOI is 545 meters for Impact Hammer w/ Bubble Curtain
10/22/2021	14:31	1	0-3	SE	Excellent	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	7	0	Male	Milling SE of Island	600	None	No	No pile driving activity taking place during mammal observation
10/22/2021	15:20	2	0-3	NW	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	8	0	Unkown	Fast Traveling NW of Island	275	None	No	No pile driving activity taking place during mammal observation
10/28/2021	15:33	2	4-6	NE	Excellent	<10	Partly Cloudy	1	DTH Hammer	Berm Construction on West wall - Pile 28W	36" steel	NO	Bottlenose Dolphin	7	0	Male	Fast traveling NE of Island	400	None	No	Level B ZOI is 215 meters for DTH
10/30/2021	11:01	1	0-3	SE	Excellent	<10	Partly Cloudy	1	None	No activity during sighting	N/A	NO	River Otter	1	0	Unkown	Slow Traveling S of boulders on PI 1	50	None	No	No pile driving activity taking place during mammal observation
11/4/2021	12:11	2	0-3	S	Excellent	<10	Mostly Cloudy	1	None	No activity during sighting	N/A	NO	Bottlenose Dolphin	5	0	Male	Slow Traveling S of Island	150	None	No	No pile driving activity taking place during mammal observation
11/9/2021	13:15	1	0-3	SE	Excellent	<10	Sunny	1	DTH Hammer	Berm Construction on West Wall	36" Steel	No	Bottlenose Dolphin	7	0	Unkown	Fast Traveling E of Island	750	None	No	Level B ZOI is 215 meters for DTH
11/16/2021	13:21	1	0-3	SE	Excellent	<10	Sunny	1	DTH Hammer	Berm Construction on West Wall	36" Steel	No	Bottlenose Dolphin	6	0	Male	Fast Traveling W of Island	1100	None	No	Level B ZOI is 215 meters for DTH
New IHA Issued																					
														*Indicates possible duplicate							
														*indicatesLevel B Harrassment							
														*IndicatesLevel A Harrassment							

APPENDIX D-

Protected Species Observer's Credentials

AMY WHITT, M.E.M.

Protected Species Biologist

Education

MEM (Master of Environmental Management), Duke University, 2004

BS, Biology, Lyon College, 2002

Training/Certifications

NOAA-Approved Protected Species Observer

Certified BOEM Protected Species Observer for Seismic Operations

ESA and MMPA Compliance Training (National Marine Fisheries Service)

Marine Mammal Rescue and Rehabilitation Certification

Water Survival/HUET/METS Certification

NOAA Cold Water Survival Training

OSHA 40-hour HAZWOPER Certification

NOAA NRDA Data Management Training

Project Management Professional (PMP)®

PADI Oxygen Provider

PADI NITROX Diver Certification

NAUI Advanced Rescue SCUBA Diver Certification

PADI Advanced Open Water SCUBA Diver Certification

PADI Open Water Certification

American Red Cross certified, Workplace Training: Adult CPR with AED

American Red Cross certified, First Aid Basics

Clear Writing Training for NEPA Specialists (The Shipley Group)

Environmental Education

Qualifications

Ms. Whitt is a senior marine biologist with over 15 years of professional experience in coastal environmental management, marine conservation and education, and ocean policy. She specializes in protected species biology, management, and conservation with an emphasis on marine mammals and sea turtles. She is a NOAA-approved observer and a BOEM-certified observer for seismic operations and has conducted over 80 marine species research and environmental compliance projects across the globe for a variety of clients including NOAA, the U.S. Navy, the oil and gas industry, and the offshore renewable energy industry.

Ms. Whitt is a published scientist with research expertise in shipboard and aerial survey design and implementation, marine species identification, marine protected species monitoring, data management and analysis, abundance/density modeling, behavioral assessments, photo-identification studies, human impact studies, and Natural Resource Damage Assessments (NRDA). She has spent over 4 years conducting shipboard surveys of marine mammals/sea turtles (560+ days at sea) and over 180 flight hours conducting marine mammal/sea turtle aerial surveys. Ms. Whitt is also an environmental compliance specialist with expertise in preparing environmental impact assessments, biological assessments, take/harassment authorizations, and monitoring/mitigation plans in compliance with international and federal policies including, but not limited to, the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and Marine Mammal Protection Act (MMPA).

Selected Relevant Experience

French Guiana Marine Fauna Surveys & Monitoring, Azura Consulting LLC, Cohabys-Adera, Creocean, and Total E&P – Marine Fauna Observer, 2018-2019. Azura joined the Cohabys – Adera team for Creocean to conduct marine mammal surveys off French Guiana prior to and during oil and gas drilling operations in Total-operated blocks in the French Guiana EEZ. Two types of surveys were conducted. The large-scale survey aimed to collect data on the presence and distribution of marine mammals, as well as sea turtles and seabirds, up to 40 km around the drill site. During the small-scale survey, scientists visually monitored for marine mammals and sea turtles up to 4 km around the drill site during drilling operations. Scientists also utilized a passive acoustic monitoring system (Sercel's QuietSeaTM system) to acoustically monitor for marine mammals in real-time. Ms. Whitt served as one of the three observers on the large-scale survey aboard the sailboat (the Guyavoile) and recorded sightings of marine mammals, seabirds,

Certification

Introduction to Distance Sampling Workshop--Centre for Research into Ecological and Environmental Modeling (CREEM), St. Andrews University, Scotland

Advanced Distance Sampling/Surface Modeling Workshop (CREEM), St. Andrews University, Scotland

Publications/Presentations

Whitt, A.D., A. Warde, L. Blair, K.J.P. Deslarzes, and C.-H. Chaineau. In prep. Recent occurrence of marine mammals and sea turtles off Angola and first report of right whales since whaling era.

Barry, K.P., **A.D. Whitt**, M. Baran, P.E. Rosel, and K.D. Mullin. In Prep. An assessment of killer whale sightings in the northern Gulf of Mexico.

Latusek-Nabholz, J.N., **A.D. Whitt**, D. Fertl, D.R. Gallien, K. Ampela, A.A. Khan, and N. Sidorovskaia. 2020. Literature synthesis on passive acoustic monitoring projects and sound sources in the Gulf of Mexico. New Orleans (LA): US Department of the Interior, Bureau of Ocean Energy Management. Contract No.: M17PC00001. OCS Study BOEM 2020-009.

Whitt, A.D., J.A. Powell, A.G. Richardson, and J.R. Bosyk. 2015. Nearshore abundance and distribution of marine mammals in New Jersey waters. Journal of Cetacean Research and Management 15:45–59.

Whitt, A.D., M.A. Baran, M. Bryson, and L.E. Rendell. 2015. First report of killer whales harassing sperm whales in the Gulf of Mexico. Aquatic Mammals 41(3):252-255. DOI 10.1578/AM.41.3.2015.252

Whitt, A.D., K. Dudzinski, and J.R. Laliberté. 2013. North Atlantic right turtles, and large pelagic fish and anthropogenic activities.

Senegal Environmental Baseline Study, Azura Consulting LLC, Creocean, and Total E&P – Lead Marine Fauna Observer, 2018. Azura's marine scientists studied the marine megafauna in deep waters off Senegal for Creocean as part of an Environmental Baseline Study (EBS) for Total Exploration and Production (E&P). The goal of this EBS was to characterize the habitat and biodiversity of an area of oil and gas exploration off Senegal. The biological and physio-chemical characteristics of the sediment and seawater were assessed during offshore surveys. During these surveys, Azura recorded opportunistic sightings of marine mammal, sea turtle, seabird, and fish species during daytime visual observations. Ms. Whitt served as the lead visual observer and was responsible for coordinating team members, reviewing all data, analyzing sightings data, and preparing the survey report.

Mauritania Environmental Baseline Study, Azura Consulting LLC, Creocean, and Total E&P – Lead Marine Fauna Observer, 2018. Azura's marine scientists studied the marine megafauna in deep waters off Mauritania for Creocean as part of an EBS for Total E&P. The goal of this EBS was to characterize the habitat and biodiversity of an area of oil and gas exploration off Mauritania. The biological and physio-chemical characteristics of the sediment and seawater were assessed during offshore surveys. During these surveys, Azura recorded opportunistic sightings of marine mammal, sea turtle, seabird, and fish species during daytime visual observations. We also conducted passive acoustic monitoring at night to record vocalizing marine mammals. Ms. Whitt served as the lead visual observer and was responsible for coordinating team members, reviewing all data, analyzing sightings data, and preparing the survey report.

Angola Environmental Baseline Study, Azura Consulting LLC, Creocean, and Total E&P Angola – Lead Marine Fauna Observer, 2018. Azura's marine scientists studied the marine megafauna in deep waters off Angola for Creocean as part of an EBS for Total E&P Angola. The goal of this EBS was to characterize the habitat and biodiversity of an area of oil and gas exploration 400 km northwest of Luanda, Angola. The biological and physio-chemical characteristics of the sediment and seawater were assessed during offshore surveys. During these surveys, Azura recorded opportunistic sightings of marine mammal, sea turtle, seabird, and fish species during daytime visual observations. We also conducted passive acoustic monitoring at night to record vocalizing marine mammals. Ms. Whitt served as the lead visual observer and was responsible for coordinating team members, reviewing all data, analyzing sightings data, and preparing the survey report.

whale distribution and seasonal occurrence in nearshore waters off New Jersey, USA, and implications for management. Endangered Species Research 20(1): 59-69.

Whitt, A.D. 2013. Getting it right: Right whales and offshore renewable energy development. Right Whale News 21(2): 3-7.

Whitt, A.D. 2012. Review of Marine Protected Areas for Whales, Dolphins and Porpoises: A World Handbook for Cetacean Habitat Conservation and Planning, 2nd Edition, by Erich Hoyt. Aquatic Mammals 38(2): 224-226.

Whitt, A.D., T.A. Jefferson, M. Blanco, D. Fertl, and D. Rees. 2011. A review of marine mammal records of Cuba. Latin American Journal of Aquatic Mammals 9(2): 65-122.

Zoidis, A.M., M.A. Smultea, A.S. Frankel, J.L. Hopkins, A.J. Day, S.A. McFarland, **A.D. Whitt**, and D. Fertl. 2008. Vocalizations produced by humpback whale (*Megaptera novaeangliae*) calves recorded in Hawaii. Journal of the Acoustical Society of America 123(3): 1737-1746.

Whitt, A.D. 2008. Integrated Coastal Management (ICM). Pages 231-232 in M. Lück, ed. Encyclopedia of tourism and recreation in marine environments. Cambridge: CABI.

Whitt, A. D. 2008. Marlborough Sounds, New Zealand. Page 305 in M. Lück, ed. Encyclopedia of tourism and recreation in marine environments. Cambridge: CABI.

Whitt, A.D., and A.J. Read. 2006. Assessing compliance to guidelines by dolphin-watching operators in Clearwater, Florida, USA. Tourism in Marine Environments 3(2):117-130.

Whitt, A.D., M. Baran, and L. Rendell. First report of killer whales harassing

LADC-GEMM Survey, Azura Consulting LLC and University of Louisiana at Lafayette – Lead Marine Mammal Observer/Identification Specialist, 2017. The Littoral Acoustic Demonstration Center-Gulf Ecological Monitoring and Modeling (LADC-GEMM) is a consortium of scientists who have been studying marine mammal acoustics and ambient noise in the Gulf of Mexico since 2001. LADC-GEMM conducted this visual and acoustics shipboard survey to quantify short-term and long-term changes in baseline ambient noise levels and marine mammal distribution in the Mississippi Canyon region of the northern Gulf of Mexico near where the Deepwater Horizon oil spill incident occurred in 2010. Azura provided the big eye equipment and lead the visual observations for the survey. Ms. Whitt served as the lead visual observer and the marine mammal identification expert and trained observers in the use of the big eyes and marine mammal survey methods. She managed the visual observation schedule, crew, and data input verification during the cruise. When possible, she confirmed all species identifications recorded. Amy also contributed to the cruise technical report and worked with the LADC-GEMM data manager to ensure accurate marine mammal sighting recordings and to submit data to the GRIIDC database. She provided input to improve accuracy of acoustic marine mammal abundance studies in the northern Gulf of Mexico.

Big Eye Testing for Full Ship Shock Trials (FSST), BMT Designers and Planners Inc. and NAVSEA – Protected Species Specialist, 2017. During the LADC-GEMM Survey, Ms. Whitt acquired, installed, and tested U.S. Navy big eye equipment so that the equipment could be thoroughly tested prior to use in the monitoring of protected species (e.g., marine mammals, sea turtles) during the Navy's future planned FSST. During the survey, she documented any issues with the equipment and noted recommendations for improvements. After completion of the surveys, she prepared a detailed report of these issues and recommendations for the Naval Surface Warfare Center. In addition to suggestions for improving the big eye equipment, she provided recommendations for additional equipment needed for the FSST and specific protocols for big eye use during FSST in this report, including calibration of the bearing rings and how to adjust the big eyes for each observer and properly scan for marine mammals.

Ship Shock Aerial Survey Monitoring, Azura Consulting, HDR, and NAVFAC Atlantic – Protected Species Observer, 2016. As part of the U.S. Navy's Marine Species Monitoring Program, protected species aerial surveys were conducted during Full Ship Shock Trials (FSST) events off the coast of Jacksonville, Florida. Conducted visual surveys for protected species (cetaceans, manatees, and sea turtles) and *Sargassum* mats for three days prior to, the day of, and three days following

sperm whales in the Gulf of Mexico. 2013 Society for Marine Mammalogy 20th Biennial Conference on the Biology of Marine Mammals, Dunedin, New Zealand, 9-13 December. (Poster presentation).

Whitt, A.D., C. Bonnes, and B. Williams. Development of marine mammal stranding and identification/viewing smartphone apps for the Southeast Region. 2012 Bays and Bayous Symposium, Biloxi, Mississippi, November 14-15. (Oral presentation).

Whitt, A.D., K. Dudzinski, and J.R. Laliberté. Endangered marine mammals of the Jersey Shore. 2011 Society for Marine Mammalogy 19th Biennial Conference on the Biology of Marine Mammals, Tampa, Florida, 28 November-2 December. (Poster presentation).

Dudzinski K., **A.D. Whitt**, and J.R. Laliberté. North Atlantic right whale seasonal presence off the coast of New Jersey: Confirmation by passive acoustic monitoring and ship survey data. 2011 Acoustical Society of America, 161st Meeting, Seattle, Washington, 23-27 May. (Oral presentation).

Whitt, A.D., J.A. Powell, A.G. Richardson, J.R. Laliberté, and G.A. Buchanan. Abundance, density, and distribution of marine mammals in New Jersey's nearshore waters. 2010 North American Offshore Wind Conference, Atlantic City, New Jersey, 5-7 October. (Poster presentation).

Whitt, A.D., J.A. Powell, A.G. Richardson, J.R. Laliberté, D.L. Wilkinson, and G.A. Buchanan. Abundance, density, and distribution of marine mammals in New Jersey's nearshore waters. 2009 Society for Marine Mammalogy 18th Biennial Conference on the Biology of Marine

each detonation event. The primary goal of these surveys was to ensure that the entire area was covered thoroughly to minimize the risk to marine species on the day of each detonation. Provided daily reports to the HDR project manager; sighting information was used to direct the Navy as to appropriate locations for FSST detonations.

AMAPPS (Atlantic Marine Assessment Program for Protected Species) Shipboard Survey, NOAA and IAP World Services – Fisheries Observer/Marine Mammalogist, 2016. AMAPPS is a collaborative program involving BOEM, U.S. Navy, NOAA Fisheries, and U.S. Fish and Wildlife Service. The program focuses on collecting seasonal data on the abundance, distribution, and behavior of marine mammals, sea turtles, and seabirds throughout the U.S. Atlantic EEZ and providing spatially explicit information in a format that can be used by Federal decision makers with living marine resource responsibilities. Conducted visual operations aboard the NOAA R/V *Gordon Gunter* during an intensive effort to collect distribution and abundance data on marine mammals and sea turtles in the Mid-Atlantic and off the southeast U.S. between Delaware and Florida. In order to estimate the detection probabilities for observed marine mammal groups, this line-transect survey utilized a double platform approach in which two independent teams of visual observers operated from the flying bridge (the upper team) and the bridge wing (the lower team). Conducted visual observation operations via big eye binoculars, handheld binoculars, and naked eye. Recorded environmental data and sightings and behavioral data of marine mammal species sighted during this study.

Sperm Whale Autonomous Tracking (SWAT) Study, Gulf of Mexico, NOAA and IAP World Services (Jun – Jul 2014) – Fisheries Biologist/Marine Mammalogist. Ms. Whitt conducted visual operations aboard the NOAA R/V *Gordon Gunter* during an intensive effort to satellite tag, biopsy, and photograph sperm whales in the southeastern Gulf of Mexico. Conducted surveys using big eye binoculars.

Marine Mammal and Sea Turtle Occurrence Study, French Guiana, CREOCEAN and Shell Exploration and Production Inc. and GMI (Apr – Jun 2013) – Principal Investigator/Project Manager/Protected Species Observer. Visual observations were conducted during benthic surveys to document the occurrence of marine mammal and sea turtle species off the coast of French Guiana in the spring of 2013. The observer team detected animals via big eye binoculars and naked eye during daytime benthic survey operations. Ms. Whitt designed the systematic study and led the observation efforts. She also managed the database and developed a final report of all sightings recorded. The opportunistic sightings and

Mammals, Quebec City, Canada, 12-16 October. (Poster presentation).

Laliberté, J.R., **A.D. Whitt**, and J.H. See. A shifting paradigm: Marine mammals and offshore alternative energy development. 2009 Society for Marine Mammalogy 18th Biennial Conference on the Biology of Marine Mammals, Quebec City, Canada, 12-16 October. (Poster presentation).

Whitt, A.D., T.A. Jefferson, D. Fertl, and D. Rees. An annotated checklist of marine mammals of Cuba. 2007 Society for Marine Mammalogy 17th Biennial Conference on the Biology of Marine Mammals, Cape Town, South Africa, 29 November-3 December. (Poster presentation).

environmental data were used to determine the distribution of marine mammal and sea turtle species in the region.

Marine Mammal Monitoring during Darkness - A Research and Development Study, Fishermen's Atlantic City Windfarm, LLC and GMI (2012 – 2013) – Principal Investigator. Conducted Phase 1 of an R&D study to identify and test technologies to find devices or a combination of systems (visual and acoustic technologies) that provide effective detections of small and large marine mammals at sea during periods of darkness and to develop and implement a new strategy for using these systems in concert to monitor for the presence of marine mammals within and near an exclusion zone at night. For Phase 1 of this study, Ms. Whitt conducted a literature review of previous research and tests of devices used to visually detect marine mammals during darkness. In coordination with Senior Acoustician Dr. Dudzinski, she also developed a proof-of-concept plan for testing the devices and systems (combination of visual and acoustic devices) that may prove to be effective for nighttime monitoring of marine mammals in and around an exclusion zone. Phase 2 of this study will include beta testing these devices and systems to determine their effectiveness.

Passive Acoustic Monitoring for Offshore Windpark Project, Fishermen's Energy and GMI – Marine Mammal Acoustician, 2012. Assisted the Senior Acoustician with analysis of acoustic data recorded from two Ecological Acoustic Recorders (EARs) deployed around 1,000 m from the planned turbine construction location in State waters off Atlantic City, NJ to provide a consistent data stream of ambient noise levels related to periods of construction and noise levels outside of construction activity. Used the software program Raven to analyze the acoustic data for ambient noise, anthropogenic noise, fish sounds, and marine mammal vocalizations. The passive acoustic monitoring and analyses are part of a multi-year program to evaluate the potential impacts of developing a utility scale wind farm on the ecology of the region.

Marine Mammal and Sea Turtle Survey Protocol in Support of the Site Assessment Plan for the Mid-Atlantic Wind Park off the Coast of DE, NRG Bluewater Wind DE, LLC, Tetra Tech EC, Inc., and GMI (Dec 2011 – Apr 2012) – Protected Species Specialist. Developed the Marine Mammal and Sea Turtle Survey Protocol for NRG Bluewater and Tetra Tech. Provided information on previous marine mammal/sea turtle studies in the region and GMI's proposed approach to obtaining site-specific baseline data on marine mammal and sea turtle occurrence, distribution, abundance/density, movement/migration patterns, and behavior within the Project Area. These data will provide NRG Bluewater and regulators

with the necessary details to inform permitting and licensing of the Mid-Atlantic Wind Park Project. The data will also aid in the development of potential monitoring and mitigation strategies for minimizing impacts on marine resources, particularly species protected under federal statutes such as the ESA and MMPA.

Ecological Baseline Study for Marine Mammals, Sea Turtles, and Avian Species, New Jersey, NJDEP and GMI (2008-2010) – Chief Scientist. Conducted line transect shipboard surveys of marine mammals and sea turtles along the NJ coastline to estimate the abundance and understand the distribution of species/populations. Responsible for managing the research team and ensuring survey protocols and NOAA permit requirements were maintained. Identified species and estimated school size and composition using "big-eye" binoculars and 7x handheld binoculars. Managed sightings database and performed quality checks on all data entries using SAS. Modeled density and abundance estimates of marine mammals using Distance 6.0. Ensured compliance with NOAA Permit No. 10014, served as principal investigator on this permit, monitored all marine mammal/sea turtle takes, and prepared all reports required under the permit.

Protected Species Monitoring and Mitigation Measures for Mid-Water Trawl Sampling, Gulf of Mexico, NOAA and GMI (2011) – Lead Protected Species Observer. Trawl sampling operations were conducted aboard the NOAA R/V *Pisces* during two Summer 2011 cruises in the northern Gulf of Mexico as part of NOAA's NRDA following the Deepwater Horizon oil spill incident. Because trawl sampling overlapped with the occurrence of several species of marine mammals and sea turtles, monitoring and mitigation plans were developed in an attempt to prevent incidental takes of protected species. Ms. Whitt implemented monitoring and mitigation protocols in an attempt to prevent incidental takes of protected species. She was responsible for collecting marine mammal and sea turtle species sightings, behavior, and photographic data and monitoring for protected species before and during trawl sampling via "big eye" binoculars. She coordinated with the PAM team on all marine mammal detections prior to trawl deployment. Ms. Whitt also managed the protected species visual database and adhered to NOAA and NRDA protocols for data collection and chain-of-custody procedures.

Southern Resident Killer Whale Monitoring and Mitigation Measures for Pile Driving and Extraction Operations, Washington, National Park Service – Marine Mammal Observer, August 2011. Conducted visual surveys for the endangered Southern Resident killer whale (SRKW) before, during, and after in-water pile installation/extraction operations

relating to improvements planned for the Nippon Paper Industries facility on Ediz Hook in Port Angeles, Washington. Responsible for collecting sighting and photographic data of SRKWs and other protected species via boat-based observations. Implemented monitoring and mitigation protocols in an attempt to reduce potential impacts on SRKWs.

Investigation of Marine Mammal Morbidity and Mortality through Active Surveillance for Strandings, Gulf of Mexico, NOAA – Principal Investigator/Project Manager, March-June 2011. Conducted weekly aerial surveillance surveys along the seaward shoreline from the eastern end of Atchafalaya Bay, Louisiana, to the Mississippi-Alabama state line, including the Chandeleur Islands and Mississippi barrier islands. The primary objective of these systematic surveys was to provide rapid and complete detection of stranded marine mammals and sea turtles so that NMFS can better determine the conditions, lesions, and causes of strandings and detect changes that may be attributable to the Deepwater Horizon oil spill incident which occurred in April 2010. Served as principal investigator with complete responsibility for coordinating and leading the aerial survey team and managing the database of sightings and strandings per NOAA and NRDA protocols. Responsible for communicating with and reporting all marine mammal/sea turtle strandings to the NMFS Southeast Regional Office Stranding Coordinator to initiate a rapid response effort to investigate the potential causes of morbidity and mortality. Ensured compliance with NOAA Permit No. 779-1633; served as co-principal investigator on this permit, monitored all marine mammal/sea turtle takes, and prepared all reports required under the permit.

Marine Mammal Monitoring during Geophysical Surveys, New Jersey, Bluewater Wind and GMI (2009) – Lead Protected Species Observer. Responsible for collecting protected species sightings data and monitoring for marine mammals within the 500 m exclusion zone around the sound sources which included a Geopulse boomer and multiple side-scan, chirp, and multibeam sonars to identify the subsurface stratigraphy, geomorphologic variations, and natural and man-made obstructions that may be present on the seafloor. Drafted reports of monitoring efforts and sightings in the survey areas.

Justin Fuller

2404 Arctic Ave
Virginia Beach, Virginia
(757) 748-6241
justingfuller@gmail.com

Summary

• Extensive knowledge of MMPA, ESA, and NOAA wildlife regulations.
• Highly organized with ability to prioritize and handle multiple tasks simultaneously.
• Comprehensive knowledge in Virginia's marine and estuarine habitats.
• Excellent oral and written communication skills, interpersonal and facilitation skills with multiple levels of external guests and internal staff.
• Efficient in all Microsoft Office Applications.
• Experience in supervising, training staff and volunteers.
• CPR/First Aid certified; AED Certified; Ladder Safety certified.

Education

University of Wisconsin
Master's of Conservation Biology
Graduated December 2019

Coastal Carolina University
Bachelor of Science in Marine Science
Graduated December 2007

Tidewater Community College
Associates of Applied Science
Graduated December 2001

Employment History

Normandeau Associates, Inc.
Marine Ornithologist
Virginia Beach, Virginia
January 2020 – Present
• Record avian species observed during the field surveys around the test turbines for the Coastal Virginia Offshore Wind Project

• Utilize software that records GPS location, as well as direction, speed, time, and date for documenting the exact tracts the avian species were observed on

Rudee Tours
Naturalist/Researcher
Virginia Beach, Virginia
May 2020 – Present
• Naturalist/researcher on wildlife excursion boat trips, and other specialty trips. Educate the public about the wildlife and habitats found off of Virginia's coast, as well as ESA and MMPA laws, and NOAA wildlife watching regulations.

• Record marine mammal, sea turtle, and avian species spotted during the boat trips, including photographing and documenting the location of threatened and endangered species.

• Assist with maintenance of the vessels between trips.

Virginia Aquarium & Marine Science Center
Exhibit Tech 1/Educator
Virginia Beach, Virginia
February 2007 – Present

• Conducted an offshore bird survey with the Center for Conservation Biology and William & Mary, under Virginia Aquarium grant for potential wind farm locations off the Virginia coast.

• Assisted with the Osprey Watch research program with the Center for Conservation Biology, banding, recording, and monitor osprey and nests.

• Interpreter on dolphin and whale watching boat trips, and other specialty trips. Educated the public about the wildlife and habitats found off of Virginia's coast, as well as ESA and MMPA laws, and NOAA wildlife watching regulations.

• Identified and documented marine species, including but not limited to: manatees, bottlenose dolphins, common dolphins, humpback whales, fin whales, minke whales, North Atlantic right whales, along with sea turtles. As well as recorded environmental data during the trips.

• Reported any violations of ESA & MMPA laws, in addition to NOAA wildlife watching regulations.

• Responsible for the daily husbandry of the harbor seals, river otters, reptiles, amphibians, birds, and quarantine animals.

• Rabies pre-exposure up to date.

• Supervised and trained animal care volunteers, and part-time employees.

Coastal Carolina University
Researcher
August 2002 – December 2007
• Assisted with a population study on indigenous shark species of Winyah Bay, SC, tagging sharks from pup size to large bull sharks.

• Drew blood samples for chemical analysis, as well as record size and body status.

• Conducted population study of bottlenose dolphin population off the South Carolina coast.

RPS Offshore Protected Species Observer Training

This is to verify that

Justin Fuller

Has successfully completed a course of instruction in
Training for Seismic Mitigation
Under the BOEM NTL 2016-G02

This certificate of Completion awarded

This 10th day of October 2021

RPS
20405 Tomball Parkway, Building 2, Suite 200
Houston, TX 77070
Tel: (281) 448-6188
Fax: (281) 448-6189

Stephanie Miller / Jessica Richardson
BSEE Approved Instructor(s)

Greetings Justin:

Thank you for your interest in obtaining approval from NOAA's National Marine Fisheries Service (NMFS) to work as a Protected Species Observer (PSO). We have reviewed your credentials and made the following determinations:

You meet the NMFS training and experience recommendations for PSOs serving at general nearshore construction projects such as pile driving, explosive demolitions, mechanical dredging, and dredged material disposal; and

You meet the NMFS "conditional" training and experience recommendations for PSOs serving aboard hydraulic hopper dredges. See our website for additional on-the-job training.

Please note that this approval is only valid for activities noted above, such as nearshore construction, pile driving, demolitions, dredging, and spoils disposal in the Western Atlantic Ocean and Gulf of Mexico.

For more information on PSO approval for geophysical surveys, such as bottom profiling using sonar or other electromagnetic devices or for seismic surveys that use air guns, please contact nmfs.psoreview@noaa.gov. Further, this approval is not applicable to the Northeast Fisheries Observers Program or the Platform Removal Observer Program.

Please ensure that you retain a copy of this approval for your records and that you carry a copy while conducting PSO duties. We appreciate your efforts in the conservation of protected species and look forward to working with you in the future.

Sincerely,

Max

TRITT.HOWARD.M.1077677387

Digitally signed by TRITT.HOWARD.M.1077677387
Date: 2021.12.27 10:43:04 -05'00'

H. Max Tritt
Fishery Biologist
Greater Atlantic Fisheries Office
National Marine Fisheries Service
17 Godfrey Drive, Suite 1
Orono, ME. 04473
Tel: 207.866.3756

ALYSSA J. MUHLENDORF

Certifications/Education History

MARINE NATURALIST TRAINING
The Whale Museum, April 2021
Intensive 40 hour overview of the natural history of the Salish Sea including an in-depth review of the ecology and conservation of local marine species.

ENVIRONMENTAL LAW COMPLIANCE COURSEWORK
The Shipley Group, March and June 2021
Overviews of the: Marine Mammal Protection Act, Endangered Species Act, and National Environmental Policy Act; Environmental Risk and Public Involvement.

PROTECTED SPECIES OBSERVER (PSO) CERTIFICATION
Marine Protected Species Consulting, February 22, 2021

CHESAPEAKE STEWARD TRAINING
Chesapeake Bay Foundation, 2014-2015
20 course and 20 hour service project about the Chesapeake Bay watershed and the challenges and opportunities in restoration.

NORFOLK STATE UNIVERSITY
Masters in Social Work, 2010

AMERICAN UNIVERSITY
Masters in International Affairs, 2001

UNIVERSITY OF PUGET SOUND
Bachelors in Politics & Government, 1999

Environmental Experience

MARINE MAMMAL OBSERVER
Azura Consulting | 2021-Present
Utilized knowledge of marine mammals in the Chesapeake Bay to monitor for marine mammals, interpret animal behavior and monitoring protocols, and select appropriate mitigation measures to ensure compliance with the Parallel Thimble Shoals Tunnel Project's monitoring plan and permits.

VOLUNTEER NATURALIST
Rudee Tours | 2021-Present
Educated guests and answered questions about Atlantic bottlenose dolphins and Virginia Beach waterways during two hour dolphin watching trips.

DIRECTOR OF DEVELOPMENT
Lynnhaven River NOW | 2019-2021
Created and implemented successful strategies to inspire giving to restore and protect Virginia Beach's waterways. Launched the organization's endowment. Managed 3 fundraisers per year and cultivated donor relationships. Connected donors with environmental stewardship activities. Managed and improved the functionality of the donor database.

OYSTER GARDENER
Chesapeake Bay Foundation (CBF) | 2014-Present
Tended 2,000 spat-on-shell per year in multiple cages off our family's dock. Returned the oysters annually to the CBF to be part of local sanctuary oyster reefs to increase the local native oyster population.

Executive Summary

- Dynamic, motivated professional with infectious enthusiasm, great organizational and interpersonal skills, and a passion for environmental stewardship and marine life.
- Excellent verbal, written, database, and social media skills.
- Lifelong passion for studying and observing marine life. Explored marine habitats on boats and land in Hawaii, Belize, Baja California, Bahamas, Florida, and throughout the Puget Sound and Virginia.
- Sailboat owner.
- Authored articles about native plants and environmental stewardship in the Jewish News of Southeastern Virginia and East Beach Penninsula Life magazine.

Other Work Experience

FUNDRAISER FOR POLITICAL CAMPAIGNS
State & Congressional Races | 2017-2019

COORDINATOR
Chesapeake Connections Foster Care | 2010-2013

CLINICIAN, GRADUATE DEGREE INTERN
Bon Secours Employee Assistance Program | 2009-2010

AGENCY DIRECTOR'S GRADUATE INTERN
Chesapeake Human Services | 2008-2009

SPECIAL NEEDS CASE MANAGER
Jewish Family Service | 2005-2008

HUMAN RIGHTS ADVOCATE
Zimbabwe Democracy Trust | 2003-2004

STAFF ASSOCIATE
Committee on International Relations, U.S. House of Representatives | 2000-2003

TECHNICAL EDITING ASSISTANT
Abt Associates | 1999-2000

Contact Details

Mobile: (757) 470-9218
Email: alyssajorgenson@gmail.com
Address: 9643 24th Bay Street, Norfolk, VA 23518

Marine Protected Species Consulting
Protected Species Observer Certification

This is to verify that

Alyssa Muhlendorf

Has successfully completed a course of training
For seismic mitigation under the
BIOLOGICAL OPINION on the Federally-Regulated Oil and Gas Program Activities in the Gulf of Mexico

Protected Species Observer

On this day the
22nd of February 2021

MPSC
Marine Protected Species Consulting 2021022006

Angela Bostwick
Angela Bostwick, NMFS/BOEM/BSEE-Approved Instructor

Gmail **Amy Whitt <amy@azuraco.com>**

PSO Epproval

1 message

Alyssa Muhlendorf <alyssajorgenson@gmail.com> Wed, Jun 30, 2021 at 11:14 AM
To: Amy Whitt <amy@azuraco.com>

Good morning, Amy - I am happy to report that I have received NOAA approval to work as a PSO on the Thimble Shoals Project. Please see the below "e-pproval" letter.

All the best,
Alyssa Muhlendorf

---------- Forwarded message ---------
From: **Max Tritt - NOAA Federal** <max.tritt@noaa.gov>
Date: Mon, Jun 28, 2021 at 7:07 AM
Subject: PSO Epproval
To: <alyssajorgenson@gmail.com>
Cc: Kim Stanton <kstanton7218@gmail.com>

Greetings Alyssa:

Thank you for your interest in obtaining approval from NOAA's National Marine Fisheries Service (NMFS) to work as a Protected Species Observer (PSO). We have reviewed your credentials and made the following determinations:

You meet the NMFS training and experience recommendations for PSOs serving at general nearshore construction projects such as pile driving, explosive demolitions, mechanical dredging, and dredged material disposal;

You meet the NMFS "conditional" training and experience recommendations for PSOs serving aboard hydraulic hopper dredges. See our website for additional on-the-job training;

Please note that this approval is only valid for activities noted above, such as nearshore construction, pile driving, demolitions, dredging, and spoils disposal in the Western Atlantic Ocean and Gulf of Mexico.

For more information on PSO approval for geophysical surveys, such as bottom profiling using sonar or other electromagnetic devices or for seismic surveys that use air guns, please contact nmfs.psoreview@noaa.gov. Further, this approval is not applicable to the Northeast Fisheries Observers Program or the Platform Removal Observer Program.

Please ensure that you retain a copy of this email approval for your records and that you carry a copy while conducting PSO duties. We appreciate your efforts in the conservation of protected species and look forward to working with you in the future.

Sincerely,

H. Max Tritt
Fishery Biologist
Greater Atlantic Fisheries Office
National Marine Fisheries Service
17 Godfrey Drive, Suite 1
Orono, ME. 04473
Tel: 207.866.3756
Fax: 207.866.7342

Brandon R. Paquin, 2101Pamela Dr, Holiday FL 34690 PH: (305) 3043733 – E-Mail: brpaqua73@gmail.com

OBJECTIVE:

Secure work as an endangered species/Marine mammal Observer/ DMI

PROFESSIONAL PROFILE:

A marine mammal professional with twenty-five years of experience working within the zoological industry and marine mammal research communities. Extensive experience conducting NMFS Authorized inshore and offshore photo-identification research, managing marine mammal stranding events, providing rehabilitative care, conducting necropsies, aiding interventions and coordination and deployment of six dolphin health and environmental risk assessments.

EMPLOYMENT:

RMSA, NOAA contractor, Protected species observer Tide Environmental, NOAA contractor, Protected species observer, MMPA, ESA, MFO mitigator, Boston Harbor

Marine Ventures Inc, NOAA contractor, FPL(Florida power and light), Protected species observer, MMPA, ESA Mitigator

TideEnvironmental,NOAA contractor, Protected species observer, MMPA, ESA mitigator,Hopper dredge, Jupiter, Fl

Harbor Branch Oceanographic Institution, Ft. Pierce, FL
Marine Animal Rescue Society and Florida Keys Marine Laboratories Marine Mammal Conservancy, Key Largo, FL
Sarasota Jungle Gardens, Sarasota, FL
Marine Animal Rescue Society and Florida Keys Marine Laboratories Dolphin Research Center, Grassy Key, FL
Miami Metro Zoo
Miami Seaquarium

EXPERIENCE / SKILLS:

2021-2020 2003-2006 2003-2003 2003-2003 2001-2002 2000-2000 1996-1999 1995-1996 19921995

- Animal Care and Rehabilitation Technician
- Animal Health, Husbandry and Welfare
- First Responder - Rescue and Response Coordinator
- Photo-Identification Research Associate / NMFS LOC-15631 – Mazzoil)
- Health and Environmental Risk Assessment / NMFS Permit #998-1678)
- Boat Pilot (17’ – 36’) In-Shore and Offshore Navigation
- Necropsy – Pathobiological Examinations
- Behavioral Conditioning and Enrichment
- Invasive Fish Species Removal Technician
- Marine Operations, Maintenance and Inventory
- Veterinary Treatments and Diagnostic Procedures
- Operation and Use of Digital Cameras (Photo-ID)
- Operation and Application of Telemetry Systems
- Operation of Life Support Systems / Water Quality
- Educational and Outreach
- Logistics and Deployment
- Nutrition and Diet

EXPERIENCE / HIGHLIGHTS:

Brandon R. Paquin, 2101Pamela Dr, Holiday FL 34690 PH: (305) 3043733 – E-Mail: brpaqua73@gmail.com

- Participated in (6) dolphin health and environmental risk assessments (IRL/CHS)
- Conducted (3) Years of Monthly Photo-ID Research / Indian River Lagoon
- Participated in the Response & Recovery of Hurricane Katrina Dolphins (MS)
- Participated in (11) Interventions to Recover/Evaluate Entangled Dolphins
- Served as Rehabilitation Supervisor on Numerous Stranding Events
- Release and Post-Release Monitoring of Dolphins
- Jellyfish Breeding Program Assistant
- Conditional training with harbor seals and rescue and rehabilitation
- Participated in USGS Manatee Health Assessments (Crystal River)
- Response and Care for Cold Stunned Sea Turtles and Manatee
- Participated in fisheries studies and survey studies for Florida Fish and Wildlife
- Aided in the Multi-Agency Rescue and Initial Care of “Winter”

MANAGED and WILD STOCK SPECIES:

Common Bottlenose Dolphin (*Tursiops truncatus*)
Pacific White Sided Dolphin (*Lagenorhynchus obliquidens*) Striped Dolphin (*Stenella clymeme; Stenella coeruleoalba*) Pantropical Spotted Dolphin (*Stenella frontalis*)
Pygmy Sperm Whale (*Kogia Breviceps*)
Dwarf Sperm Whale (*Kogia Sima*)
Sperm whale
Long-Finned Pilot Whale (*Globicephala melas*)
Beaked Whale (*Mesoplodon spp*)
Gervais' Beaked Whale (*Mesoplodon europaeus*)
Killer Whale (*Orcinus orca*)
Manatee (*Trichechus manatus*)
California Sea Lion (*Zalophus Californianus*)

Pacific Harbor Seal (*Phoca vitulina)*
Aquarium Fish Stock, Sharks and Rays
Reptiles (*Venomous and Non-Venomous*)
Birds of Prey
Pachyderm Primates

QULAIFICATIONS / CERTIFICATION:

- Certified open water diver (PADI)
- Certified Safe Boat Operator (FWCC)
- American Red Cross First Aid and CPR Training
- Valid Florida Drivers License **REFERENCES:** Upon Request

RPS Offshore Protected Species Observer Training

This is to verify that

Brandon Paquin

Has successfully completed a course of instruction in
Training for Seismic Mitigation
Under the BOEM NTL 2016-G02

This certificate of Completion awarded

This 15th day of December 2020

RPS
20405 Tomball Parkway, Building 2, Suite 200
Houston, TX 77070
Tel: (281) 448-6188
Fax: (281) 448-6189

Stephanie Miller / Jessica Richardson
BSEE Approved Instructor(s)

Greetings Brandon:

Thank you for your interest in obtaining approval from NOAA's National Marine Fisheries Service (NMFS) to work as a Protected Species Observer (PSO). We have reviewed your credentials and made the following determinations:

- You meet the NMFS training and experience recommendations for PSOs serving at general nearshore construction projects such as pile driving, explosive demolitions, mechanical dredging, and dredged material disposal;

- You meet the NMFS **"unconditional"** training and experience recommendations for PSOs serving aboard hydraulic hopper dredges;

Please note that this approval is only valid for activities noted above, such as nearshore construction, pile driving, demolitions, dredging, and spoils disposal in the Western Atlantic Ocean and Gulf of Mexico.

For more information on, or PSO approval for, any type of geophysical surveys, such as bottom profiling using sonar or other electromagnetic devices, or for seismic surveys that use air guns, please contact nmfs.psoreview@noaa.gov. Further, this approval is not applicable to the Northeast Fisheries Observers Program or the Platform Removal Observer Program.

Please ensure that you retain a copy of this email approval for your records and that you carry a copy while conducting PSO duties. We appreciate your efforts in the conservation of protected species and look forward to working with you in the future.

Sincerely,

H. Max Tritt
Fishery Biologist
Greater Atlantic Fisheries Office
National Marine Fisheries Service
17 Godfrey Drive, Suite 1
Orono, ME. 04473
Tel: 207.866.3756

PAUL J ORYEM

314-514-5701 | paul@innoviummarine.com

PROFESSIONAL SUMMARY

Marine environmental services assignments on decommissioned oil rigs and pipelines, clamshell dredging operations, sea wall restoration projects, hopper dredges (channel maintenance and beach nourishment) and other maritime construction activities.

Environmental Inspector role(s):

- ✦ Health and Safety Plan (HASP) adherence and daily reports of operational activities and other aspects including applicable observations regarding spills, sheens, debris overboard
- ✦ Conducted environmental orientations, tracked and updated training to third party contractors of company, state and federal statutes, regulations and guidelines
- ✦ Documented observable protected species sightings and environmental conditions on approved data forms and reported all incidents to designated personnel
- ✦ Monitored a 360° exclusion zone for protected species around maritime operations. Advised captain and crew regarding vessel speed restrictions and activities (from applicable permit referenced guidance) in the event of protected species observations

On US Army Corps of Engineers projects utilized Operations and Dredging Endangered Species System (**ODESS**) for reporting and monitoring compliance with Federal regulations: ***Endangered Species Act*** (ESA) and the ***Marine Mammal Protection Act*** (MMPA)

- ✦ Monitoring and recording marine species and behaviors during regulated construction activities
- ✦ Maintaining accurate, unbiased scientific data and following required protocols
- ✦ Identifying sea turtles, birds, and marine mammals at a species-level, both at distances and by body parts; estimating distance, quantity, and behaviors of animals during observation activities

CREDENTIALS, CERTIFICATIONS and TRAINING

US Passport & Trusted Traveler Programs: Global Entry, **NEXUS** card for Canada, Asia Pacific Economic Cooperation **(APEC) Business Travel Card**, TSA **PreCheck**

Commercial Drivers License (Class B ***CDL***) ***endorsements:*** HazMat, Tank, Airbrake, Passenger

Transportation Worker Identification Credential **TWIC card**

OGUK Medical Certificate

NSC **First Aid**, CPR and AED

IADC RigPass course including **SafeGulf** and SafeLand

Florida Boating Safety Education ID Card

Dredged Material Inspector (DMI) U.S. Army Corps of Engineers (2021)
Automated Disposal Surveillance System (ADDIS)

Florida Stormwater, Erosion & Sedimentation Control Inspector (Turbidity Monitor) Florida Department of Environmental Protection (2021)

Protected Species Observer Approval Letter Dredging, Construction National Marine Fisheries Service (NMFS) (2020)

Marine Mammal and Protected Species Training **Intelligent Ocean**(2017) King's Lynn, England
Passive Acoustic Monitoring (PAM)

Protected Species Observer (PSO) Bureau of Ocean Energy Management (BOEM)
Bureau of Safety and Environmental Enforcement (BSEE)

Marine Mammal Observer (MMO) Joint Nature Conservation Committee (JNCC)

Offshore Survival Training **Survivex**(2017) Aberdeen, Scotland

OPITO Basic Offshore Safety Induction & Emergency Training (BOSIET) with HUET, CA-EBS and EBS

Center for Environmental Education and Training **(CEET)** Saint Louis University
Occupational Safety and Health (OSHA) and environmental licenses earned through over 400+ contact hour training sessions in two modules: **Green Technology** in 2011, **Environmental Remediation** in 2015

40 Hour HAZWOPER	OSHA 7300 Permit-Required Confined Space Standard
OSHA 10 Hour Construction Safety & Health	OSHA 7405 Fall Hazard Awareness
OSHA 511 Standards for General Industry	OSHA 7410 Managing Excavation Hazards
OSHA 521 Guide to Industrial Hygiene	OSHA 7200 Bloodborne Pathogens
OSHA 7205 Health Hazard Awareness	OSHA 7105 Evacuation and Emergency Planning
OSHA 7500 Intro to Safety & Health Management	OSHA 7100 Machinery and Machine Safeguarding

Bachelor's Degree in **Biology** with minors in Chemistry and Economics Oakwood University

EXPERIENCE

Environmental Inspector (EI) August 2020 - present
On assignment as a Haley & Aldrich Field Representative providing **Federal Energy Regulatory Commission** (FERC) training and monitoring on Rigs to Reef (decommissioned oil rigs) project in the Gulf of Mexico
Tasked as a Protected Species Observer (PSO) and worked with crew to comply with Vessel Strike Avoidance protocols while in transit including 30 minute incremental reporting requirements

*Marine Endangered Species Observer (MESO) assignments as an Independent Con*tractor

Port Everglades	**Permit Number:** SAJ-1999-5545(IP-SLN)
Hopper Dredge:	Specie(s) of Concern: Marine Mammals, Turtles
Miami Beach Seawall Restoration	**Permit Number:** W912EP19C0037
Shore Based:	Specie(s) of Concern: Trichechus manatus

Fire Island, NY; Sea Bright, NJ Beach Nourishment Projects

Hopper Dredge: 5/2020-07/2020	Specie(s) of Concern: Humpback Whales
Charleston Entrance Channel Maintenance	**Permit Number:** W912hp-17-b-0004
Hopper Dredge: 12/2019-01/2020	Specie(s) of Concern: Marine mammals, sea turtles
Port of Wilmington Turning Basin Expansion	**Permit Number:**
Clam Shell Barge:	Specie(s) of Concern: Acipenser
Virginia Beach Hurricane Protection	**Permit Number:** W912-36-19C-0016
Hopper Dredge: 07/19-12/19	Specie(s) of Concern: Marine mammals, sea turtles

North Pacific Groundfish Observer *for* **Northwest Observers (NWO)** Sand Point, Akutan, Dutch Harbor 1998
Monitored vessels and shore side plants in Alaska for compliance with federal fisheries regulations including:

- Fishing effort, location, and gear type
- Composition, size, sex, and weight for catch and bycatch
- Biological samples (tissue, age structures, stomach contents)
- Fishery interactions with marine mammals and seabirds
- Incidental takes of crab, Pacific salmon, halibut, herring, & short-tailed albatross

CITIZEN SCIENCE

Sea Turtle Nest Survey Workshop/Webinar (2020) Florida Fish & Wildlife Conservation Commission (FWC)

Potomac Volunteer Water Quality Monitoring Training (2019) Potomac Riverkeeper Network

Missouri Stream Team (4564) Missouri Department of Natural Resources
Chemical monitoring and testing, biological monitoring of stream macroinvertebrates in urban watersheds, physical monitoring (i.e., visual survey). Watershed stewardship, advocacy and education including invasive species removal, stream bank stabilization and revegetation

Stream Team Academy Workshop (2018) Sedalia, MO
Watershed Connectivity, Groundwater, Rural BMPs and Urban BMPs

Water Quality Monitoring (VWQM) Workshops (2012) Cuivre River State Park, MO
Stream discharge, chemical and biological monitoring Babler State Park, MO

PROFESSIONAL AFFILIATIONS

Institute of Marine Engineering, Science and Technology (IMarEST)
Society for Marine Mammalogy (SMM)
Association of Professional Observers (APO)
Marine Mammal Observer Association (MMOA)

PROFESSIONAL EXPERIENCE

Digital Content & Creation *for* **Innovium Environmental Group** 9/2017 – Present
Provided administrative support, records management, and assisted in project creation. Templating geospatial community health GIS initiative with ESRI StoryMaps
Production coordinator: Digital Tools for Science Education, Outreach and Communication
Member of regional collaborations: *OneSTL Water and Green Infrastructure Working Group; BiodiverseCity St. Louis;* and *BiomeStl*

HazMat Compliance (TST) *for* **Clean Harbors** 3/2016 – 9/2017
Functioned as a Field Chemist within the states of Pennsylvania, Maryland, West Virginia, Virginia and the District of Columbia. Safely operated *Hazardous Materials* **(HazMat)** trucks
Responded to hazardous materials and substances at client sites. Project scope and duration adhered to the standard operating procedures of Department of Transportation (DOT), Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and the **Resource Conservation and Recovery Act** (RCRA)
Tasked as client manager for collection and transport of medical wastes at regional hospital system in compliance with Pennsylvania Department of Environmental Protection (DEP) guidelines
Functioned as a DEA representative for Clean Harbors in the destruction process of controlled substances collected from retail pharmacies and university labs

Logistics Coordinator *for* **Metropolitan Management Conference Services** 7/2014–Present
(Remote Contract) Technology support: registration database, documentation and web updates
Served in onsite logistics capacity (transportation, press room, exhibit sales, event staffing) for conferences and events

Technology Subcontractor *for* **Innovium MC** 2/2006 – 6/2014
Conducted programs in citizen science, environmental health, nature based arts programming and community engagement for volunteer community based organization: ***Digital Arts Collaborative***

TECHNICAL SKILLS

COLLABORATION:	Office 365: SharePoint, Microsoft Teams; Discord, Slack
APPLICATIONS:	G Suite, Microsoft 365: Access, Word, Excel, PowerPoint, Visio
PLATFORMS/OS:	MacOS, Windows, Apache, Ubuntu, AWS, Salesforce, Azure, Google Cloud
FRAMEWORKS:	Flutter, Ushahidi, Wordpress, HTML, CSS, Twine, Unity3D,
PRODUCTION:	Final Cut Pro, Amazon FireStick app, ROKU channels
PROGRAMMING:	Python, Dart, web scripts

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

JAN 14 2020

Paul J. Oryem
5902 Elsie Court
Clinton, MD 20725

Re: Protected Species Observer Approval

Dear Mr. Oryem:

Thank you for your interest in obtaining approval from NOAA's National Marine Fisheries Service (NMFS) to work as a Protected Species Observer (PSO). We have reviewed your credentials to determine if you have sufficient training and experience to effectively monitor for protected species interactions.

Construction, Blasting, and Pile Driving
You possess sufficient training and experience to be considered a NMFS approved observer qualified for general construction projects, including pile driving and explosive demolitions (blasting projects). This determination is based on your education, training, and previous experience conducting various types of environmental monitoring.

Dredging and Dredged Material Disposal
You have sufficient training and experience to be considered a NMFS approved PSO qualified to monitor for interactions with listed species on mechanical dredging projects. You are approved for PSO work that may be required in association with dredged material disposal operations. Additionally, have fulfilled all necessary hopper dredge-training requirements and gained the adequate experience to be an unconditionally approved PSO who can stand independent watches. You are also qualified to train and supervise conditionally approved PSOs.

We appreciate your efforts in the conservation of threatened and endangered species and look forward to working with you in the future. Please ensure that you carry a copy of this approval letter while conducting PSO duties. This approval is valid for projects in both the Greater Atlantic and Southeast Regions of the U.S. that may require PSOs. Also, please note that this approval is not equivalent to the Fisheries Observer certification offered by the NMFS Northeast Fisheries Science Center, or applicable to the Platform Removal Observer Program conducted by NMFS Southeast Fisheries Science Center. If you have any questions about these comments, please contact Max Tritt of my staff at (207) 866-3756 or Max.Tritt@noaa.gov.

Sincerely,

Jennifer Anderson
Assistant Regional Administrator
for Protected Resources

EC: Tritt, Oryem
File Code: Endangered Species Observers File 2020

INTELLIGENT OCEAN
Training and Consultancy Services

Training Certificate

This is to certify that

Paul J Oryem

has completed

JNCC
Joint Nature Conservation Committee

Joint Nature Conservation Committee Marine Mammal Observer Training

Alison Gill

Dated : 28th February 2017

Alison Gill, BSc. MSc.
JNCC Approved Marine Mammal Observer Trainer

Certificate no. JNCC_001014

21 Pentney Lakes, Common Road
Kings Lynn, Norfolk, PE32 1LE
Email: info@IntelligentOcean.com | Web: www.IntelligentOcean.com

INTELLIGENT OCEAN

Training and Consultancy Services

Training Certificate

This is to certify that

Paul J Oryem

has completed

Bureau of Ocean Energy Management (BOEM)
Bureau of Safety and Environmental Enforcement (BSEE)
Gulf of Mexico
Protected Species Observer Training

Alison Gill

Dated : 1st March 2017

Alison Gill, BSc. MSc.
BOEM/BSEE Approved Protected Species Observer Trainer

Certificate no. BSEE_000433

21 Pentney Lakes, Common Road
Kings Lynn, Norfolk, PE32 1LE
Email: info@IntelligentOcean.com | Web: www.IntelligentOcean.com

Alexandria (Allie) Ruby

abruby92@gmail.com
(314) 255-4444

Relevant Experience

Marine Ventures International, Stuart, FL
June-July 2019
Trained on both the Atlantic and Virginian clam-shell dredges. Learned on-site skills overnight, as well as proper data entry for sightings, operational pauses, and species identification.

Sea Turtle Preservation Society (Volunteer), Melbourne, FL
January 2017- April 2020
Three years of nesting surveys in Cocoa Beach, Florida identifying leatherback, loggerhead, and green turtles' nests, hatchlings, and tracks. Documented the GPS coordinates, marked each site, and communicated data with GEOMAR Environmental Consultants

Other Experience

The Great American Diving Company, St. Charles, MO
January 2016-March 2017 & Current
Maintained equipment for 75 full sets of gear, organized retail records, regular customer tank fills, and other shop duties. Assisting Instructor as staff DiveMaster.

Sea Shepherd Conservation Society (on-shore volunteer), Tampa FL
May 2018- April 2020
Advocated awareness about current projects during the Cocoa Beach Art Shows. Presented environmental information and details about offshore ships in

Certifications

PSO *August 2019*
PAM *August 2019*
ODESS *August 2019*
Professional Association of Diving Instructors (PADI) DiveMaster *April 2021*
PADI Fish Identification Specialist (awarded level one, qualified for level two)

Education

State Fair Community College, Osage Beach, Missouri
Graduated May 2014
Associate of Arts in General Studies

Northwest Missouri State University, Maryville, Missouri
June 2014 - December 2015
Senior standing for bachelor's in Marine Biology

Certificate of Completion

CSA Ocean Sciences Inc.

Protected Species Observer Training

This course has been reviewed and accepted by National Marine Fisheries Service Office of Protected Species and is compliant with the following training guidelines:

BOEM NTL 2016-G02
Florida Fish & Wildlife Conservation Commission Manatee Training

This certificate is awarded to

Alexandria Ruby

Given this 18th day of August of 2019

Mary Jo Barkaszi
Marine Mammal & Ocean Sound Director

Gmail

Amy Whitt <amy@azuraco.com>

Fwd: PSO Epproval Allie Ruby

1 message

Kim Stanton <kstanton7218@gmail.com> Thu, Dec 30, 2021 at 11:22 AM
To: Amy Whitt <amy@azuraco.com>

Kim Stanton
Marine Endangered Species Consultant

---------- Forwarded message ---------
From: **Max Tritt - NOAA Federal** <max.tritt@noaa.gov>
Date: Fri, Aug 27, 2021, 11:31 AM
Subject: PSO Epproval
To: <abruby92@gmail.com>
Cc: Kim Stanton <kstanton7218@gmail.com>

Greetings Alexandria:

Thank you for your interest in obtaining approval from NOAA's National Marine Fisheries Service (NMFS) to work as a Protected Species Observer (PSO). We have reviewed your credentials and made the following determinations:

You meet the NMFS training and experience recommendations for PSOs serving at general nearshore construction projects such as pile driving, explosive demolitions, mechanical dredging, and dredged material disposal; and

You meet the NMFS "conditional" training and experience recommendations for PSOs serving aboard hydraulic hopper dredges. See our website for additional on-the-job training;

Please note that this approval is only valid for activities noted above, such as nearshore construction, pile driving, demolitions, dredging, and spoils disposal in the Western Atlantic Ocean and Gulf of Mexico.

For more information on PSO approval for geophysical surveys, such as bottom profiling using sonar or other electromagnetic devices or for seismic surveys that use air guns, please contact nmfs.psoreview@noaa.gov. Further, this approval is not applicable to the Northeast Fisheries Observers Program or the Platform Removal Observer Program.

Please ensure that you retain a copy of this email approval for your records and that you carry a copy while conducting PSO duties. We appreciate your efforts in the conservation of protected species and look forward to working with you in the future.

Sincerely,

H. Max Tritt
Fishery Biologist
Greater Atlantic Fisheries Office
National Marine Fisheries Service
17 Godfrey Drive, Suite 1
Orono, ME. 04473
Tel: 207.866.3756
Fax: 207.866.7342

Kimberly Stanton

6365 Collins Ave. Apt 2410
Miami Beach, FL 33141
(571) 300-9562 ● kstanton7218@gmail.com

Career Progression

Protected Species Observer & Wildlife Project Manager: *Cayo Construction* April 2020-Present

- Developed an SOP PSO Standards and Procedures as a guideline for approved observers.
- Recruited, trained, and scheduled a pool of professional.
- Cultivated a professional relationship with the Jacksonville USACE district.
- Created pertinent daily, weekly, and incidental data sheets and the JSA for observers specific to pile driving activity for sea wall restoration. All of which were submitted and approved by USACE.
- Successfully completed both preparatory and initial inspection for the wildlife monitoring portion by USACE.
- Accurately maintained all necessary data sheets and submitted daily.
- Will write the final report for the wildlife portion of the environmental specs.

Protected Species Observer/ Marine Endangered Species Observer: *Independent Contractor* Aug 2008-Present

- Observed and mitigated for marine protected species (i.e. cetaceans, manatees, sea turtles and sturgeon) and reported any interaction.
- Spent 2 months aboard a survey vessel for a subsea cable survey which started on the coast of Massachusetts going offshore of Nova Scotia, Canada. Following BOEM/NMFS guidelines, I prepared a Protected Species Mitigation and Monitoring Program specific to survey area. Observed for large cetaceans, in particular the north Atlantic right whale, and other marine protected species. Wrote the MMO final report submitted once survey concluded.
- Observed aboard cutter head dredges, clamshell dredges, hopper dredges and mechanical dredges.
- Cetaceans, manatees, and sea turtles sighted from both boat-based and land-based observation points.
- Experienced in observations of cetaceans, manatees, and sea turtles in areas of high aggregation.
- Experienced in nighttime/low visibility observations on board dredges.
- Experienced working in rough conditions with limited supervision on hopper dredges in GOM and Atlantic Ocean.
- Accurately collected scientific data for each load on board hopper dredges.
- Followed National Marine Fisheries Service sampling protocols and carcass disposal when marine protected species "take" occurred.
- Able to work on ships at sea for a minimum of 3 weeks at a time, live in confined spaces, tolerate stress, and be physically fit.

Coastal and Marine Project Manager: *REMSA, Inc*. July 2019-Sept 2019

- Recruited, hired, trained, scheduled, and maintained a quality pool of observers.
- Maintained a professional working relationship between REMSA, USACE, construction companies and observers.
- Ensured REMSA met contractual obligations.
- Maintained observer field data and biological sampling quality control for multiple projects.
- Created relative data sheets dependent upon environmental specs per contract.
- Authored various project's final report in a timely manor

Deckhand: *Entertainment Cruises* Washington, DC Feb 2018-Nov 2018

Mad Science Enrichment Instructor: *Mad Science* Silver Spring, MD Oct 2016-Dec 2017

Hawaiian Monk Seal Rehabilitator: *The Marine Mammal Center's Ke Kai Ola Hospital* Kailua-Kona, HI 2015-2016

Large Whale Disentanglement & Cetacean (Dolphin and Whale) Stranding Response Volunteer: *West Hawaii Marine Mammal Response Network* Kailua-Kona, HI 2015-2016

Whale Watching Guide *Ocean Sports* Waikoloa, HI 2015-2016

Marine Biologist/Sea Turtle & Reef Educator: *Kahalu'u Bay Education Center* Kailua-Kona, HI 2015

- Educated public at popular snorkeling reef about various species and etiquette.

Larval Rearing Aquaculture Technician: *Shrimp Improvement Systems* Kailua-Kona, HI 2015

Veterinary Technician: *Pender Veterinary Centre* Fairfax, VA 2014

Raptor Rehabilitator Volunteer: *Raptor Conservancy of Virginia* Falls Church, VA 2013-2014

Wildlife/Pinniped Veterinary Technician Rehabilitation Intern: *Island Wildlife Natural Care Centre* Salt Spring Island, BC, Canada 2014

Veterinary Technician: *Blue Ridge Veterinary Associates and Blood Bank* Purcellville, VA 2011-2013

Dispensary Technician/Foal Watch Veterinary Assistant: *Virginia Tech's Marion DuPont Scott Equine Medical Center (Virginia- Maryland College of Veterinary Medicine)* Leesburg, VA 2011-2012

Pinniped Rehabilitator: *Seal Rescue and Research Center (Lenie'T Hart)* Pieterburen, Netherlands 2009-2010

Fisheries Observer: *AIS, Inc.* New Bedford, MA 2009

- Experienced working in rough conditions unsupervised on commercial fishing vessels from Rhode Island to Maine.
- Proficient with fish and protected species ID and at collecting biological samples such as scales, otoliths and DNA samples.
- Observed and documented marine protected species sightings/interactions.
- Followed NMFS sampling protocol when marine protected species "take" occurred.
- Independently performed pinniped necropsy after "take" occurred and transported animal back to NMFS office for further analysis.
- Assisted with various marine mammal necropsies performed at Wood's Hole Oceanographic Institute.
- Completed cold-water offshore survival skills course.
- Obtained NOAA confidential security clearance.

Manager, Zookeeper, Enrichment Coordinator: *Leesburg Animal Park* Leesburg, VA 2008

Pinniped Rehabilitator Volunteer: *North Coast Marine Mammal Center (NCMMC)* Crescent City, CA 2004-2007

- Coordinated stranding hotline.
- Responded to stranding's on beach to visually assess condition of pinniped.
- Assisted with all aspects of hospitalized pinnipeds and subsequent release.
- Developed successful fundraising events and public education activities.

Marine Mammal Education and Research Program (MMERP) Intern: *Humboldt State University* Arcata, CA 2004-2006

- Radio tagged and performed telemetry on Harbor seals.
- Completed cetacean surveys of Gray and Humpback whales.
- Assisted with necropsies including spending entire 3 days on a fin whale that washed ashore.
- Educated public when events occurred.

Veterinary/Kennel Assistant: *Nokesville Veterinary Clinic* Nokesville, VA 2005-2006

Wildlife Rehabilitator Volunteer: *Humboldt Wildlife Care Center* Arcata, CA 2001-2002

Great Ape House Zoo Keeper Aid Volunteer: *Smithsonian National Zoological Park* Washington, D.C. 1998-2001

.

Petting Zoo Staff: *Reston Animal Park* Reston, VA 1998

EDUCATION & CREDENTIALS

Humboldt State University Arcata, California August 2007

- *B.S. Marine Biology*
- *B.S. Zoology*

Northern Virginia Community College Sterling, VA May 2013

- *A.A.S. Veterinary Technology*

Veterinary Technician National Exam (VTNE) Passed

CERTIFICATIONS/WORKSHOPS

Sea Turtle Nesting Beach Survey *Florida Fish and Wildlife Conservation Commission* April 2020

CPR/First Aid *American Red Cross*

Protected Species Observer Certification *RPS* Feb 2019

TWIC

Certified Wildlife Rehabilitator *International Wildlife Rehabilitation Council*

PUBLICATIONS

Stanton, K. F. and Reis, S. 2007. "Isolation and Characterization of a Radiation Resistant Bacterium from the Manila Dunes", *Humboldt Journal of Microbiology* (HJM) 9: 139-147

The following PSO's are no longer present on the project:

ASHLEY A. STEINKRAUS

571.212.4290 · vonsteiny@gmail.com
U.S. Citizenship · Willing to travel/relocate

EDUCATION

Master of Natural Resources 19 December 2019
Virginia Polytechnic Institute and State University, Remote
Honors: Phi Kappa Phi, GPA 4.0

Graduate Certificate – Global Sustainability 17 August 2019
Virginia Polytechnic Institute and State University, Remote

Postbaccalaureate Certificate – Geographic Information Systems December 2016
Pennsylvania State University, Remote

Career Diploma – Wildlife and Forestry Conservation July 2012
Penn Foster, Remote

Bachelor of Science – Sociology December 2009
Virginia Polytechnic Institute and State University, Blacksburg, Virginia
Concentration: Crime and Deviance
Honors: Alpha Kappa Delta

CERTIFICATIONS

Virginia Master Naturalist Expected June 2021
Fairfax Chapter (VT, VCE, DGIF, DF, DCR, VMNH, VDEQ)

Wilderness Medicine/First Aid June 2019
NOLS

Passive Acoustic Monitor April 2014
Seiche Marine Solutions

Protected Species Observer (NTL No. 2012-G02) April 2014
Continental Shelf Associates

FIELD EXPERIENCE

International Field Experience – South Africa July 2019
Virginia Polytechnic Institute and State University

- Analyzed natural resource solutions in urban and informal housing communities, met with stakeholders to discuss resource conflict mitigation strategies
- Examined rural agriculture-conservation partnerships
- Reviewed endangered species conservation strategies, community education initiatives and anti-poaching programs at Kariega Game Reserve

Marine Mammal Observer & Supervisor February–May 2015
Gray Whales Count, Goleta, California

- Collected population and behavioral data on north-bound gray whales from coastal point count site
- Recorded sightings of other local California species, e.g. pinnipeds, sea birds and other cetaceans
- Supervised interns and trained volunteers on survey protocols and species identification

Marine Mammal Observer February–April 2013
Murdoch University, Keauhou, Hawai'i

- Collected data daily on abundance, distribution and behavior of local spinner dolphin populations
- Hiked in/out with gear pack over rugged terrain to remote field site overlooking dolphin resting bay
- Conducted boat-based photo-identification surveys; operated, trailered and cleaned 7m research vessel
- Analyzed images, matched individuals using IMatch, performed data entry and management, QA/QC

PROFESSIONAL EXPERIENCE

Biodiversity Annotation Technician – Weecology Lab February 2021–Present
University of Florida, Remote

- Identifies wading bird species and behaviors from camera trap/drone images around Everglades, FL
- Annotates tree-crowns in aerial imagery of NEON sites across the U.S. and Puerto Rico

Executive Assistant and Client Services Coordinator January 2016–November 2017
Lightning Launch, Amesbury, Massachusetts

- Recorded meeting minutes and managed C-level calendars, travel and correspondence
- Primary contact for over 70 clients, maintained client database, drafted and executed contracts
- Developed workflows, oversaw banking activities and collected payments
- Prepared monthly project progress reports for clients, composed newsletters and blog posts

Research Specialist – Encyclopedia of Life March 2016–January 2017
Harvard University, Cambridge, Massachusetts

- Researched, developed and standardized datasets of Floridian flora and fauna
- Created biodiversity cards, games and lesson plans for students and educators
- Designed educational materials for and participated in Gulf Islands National Seashore bioblitz event

Conservation Associate October 2014–January 2015
Terwilliger Consulting, Remote

- Proofread and edited comprehensive conservation plans (CCPs) and state wildlife action plans (SWAPs) for Alabama, Connecticut, Delaware and Rhode Island
- Evaluated and organized datasets in Species of Greatest Conservation Need (SGCN) databases, QA/QC
- Acted as liaison between regulatory agencies, State representatives, contractors and field teams

Conservation Intern August–September 2014
Society for Conservation Biology, Washington, D.C.

- Proofread and edited Director of Wildlife Conservation's recovery plans and recommendations
- Analyzed and synthesized federal, state, tribal and international environmental acts and agreements
- Represented SCB in meetings and briefings around Washington, D.C.

Undergraduate Research Assistant – Ix Jaguar Project August–December 2009
Virginia Polytechnic Institute and State University, Blacksburg, Virginia

- Analyzed digital/print images from camera traps deployed in Belize, data entry and management
- Identified Belizean species with target species at individual level (spot ID): jaguars and ocelots

SKILLS

Field
30+ lb. pack, acoustic hydrophones, DSLR cameras, camera traps, distance sampling, hand/power tools, GPS/EPIRB, point counts, reticle rangefinders, scope, taxonomic/dichotomous keys, theodolite, topographic maps

Tech
Adobe Pro, ArcGIS/ArcMap, Bit.ly, Canva, Dropbox, G Suite/Google Analytics, IMatch, iNaturalist, Miradi, MS Suite, Photo-ID, Pythagoras, QA/QC, QGIS, R, SEO, SPSS, Squarespace, WordPress, Wrike

VOLUNTEER

Zooniverse: Colorado Corridors Project, Beluga Bits, Dolphin Chat, Earthquake Detective, Manatee Chat, Notes from Nature, Whale Chat – Ongoing

DC Coyote Project – 2020

EXTRACURRICULAR

Backpacking, bouldering, clean-ups, hiking, free-diving, wilderness/wildlife photography