

AQUIND Limited

AQUIND INTERCONNECTOR

Environmental Statement Addendum G– Appendix 2 NOAA Tool Inputs and Spreadsheets

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

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Environmental Statement Addendum G-Appendix 2 NOAA Tool Inputs and Spreadsheets

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DOCUMENT

Document	7.8.2.2 Environmental Statement Addendum [*] &– Appendix 2 NOAA Tool Inputs and Spreadsheets
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Date	25 January 2021



Appendix 2: National Oceanic and Atmospheric Administration (NOAA) Tool inputs

Tab 'A.1: Vibratory Pile Driving' was used.

Table A1: Scenario 1 - Burgess SPL_12 h

Input		Justification/Source
Weighting Factor Adjustment (kHz)	2.5	NMFS suggested value
Sound Pressure Level (L _{ms}), specified at "x" meters (Cell B30)	155	Burgess (2005) - greatest 'more typical' received SPL
Number of piles within 24-h period	1	Project: Assumption = continuous vibro-hammering for one 12 h shift per day
Duration to drive a single pile (minutes)	720	12 h = 720 min
Transmission loss coefficient	15	NMFS suggested value (e-mail response from NOAA dated 13/11/2020)
Distance of sound pressure level (L _{rms}) measurement (meters)	14	Burgess (2005)

Table A2: Scenario 2 - Burgess SPL_24 h (considered to represent the ML scenario)

Input		Justification/Source
Weighting Factor Adjustment (kHz)	2.5	NMFS suggested value
Sound Pressure Level (L _{ms}), specified at "x" meters (Cell B30)	155	Burgess (2005) - greatest 'more typical' received SPL
Number of piles within 24-h period	1	Project: Assumption = continuous vibro-hammering for two 12 h shifts per day
Duration to drive a single pile (minutes)	1440	24 h = 1440 min
Transmission loss coefficient	15	NMFS suggested value (e-mail response from NOAA dated 13/11/2020)
Distance of sound pressure level (L _{rms}) measurement (meters)	14	Burgess (2005)



Table A3: Scenario 3 - W&H SPL_12 h

Input		Justification/Source
Weighting Factor Adjustment (kHz)	2.5	NMFS suggested value
Sound Pressure Level (L _{rms}), specified at "x" meters (Cell B30)	152	Watson & Hillhouse (2019)
Number of piles within 24-h period	1	Project: Assumption = continuous vibro-hammering for one 12 h shift per day
Duration to drive a single pile (minutes)	720	12 h = 720 min
Transmission loss coefficient	15	NMFS suggested value (e-mail response from NOAA dated 13/11/2020)
Distance of sound pressure level (L _{rms}) measurement (meters)	5	Watson & Hillhouse (2019)

Table A4: Scenario 4 - W&H SPL_24 h

Input		Justification/Source
Weighting Factor Adjustment (kHz)	2.5	NMFS suggested value
Sound Pressure Level (L _{rms}), specified at "x" meters (Cell B30)	152	Watson & Hillhouse (2019)
Number of piles within 24-h period	1	Project: Assumption = continuous vibro-hammering for two 12 h shifts per day
Duration to drive a single pile (minutes)	1440	24 h = 1440 min
Transmission loss coefficient	15	NMFS suggested value (e-mail response from NOAA dated 13/11/2020)
Distance of sound pressure level (L _{rms}) measurement (meters)	5	Watson & Hillhouse (2019)

Table A5: Scenario 5 - max Burgess SPL_24 h

Input		Justification/Source
Weighting Factor Adjustment (kHz)	2.5	NMFS suggested value
Sound Pressure Level (L _{rms}), specified at "x" meters (Cell B30)	161	Burgess (2005) - max received SPL
Number of piles within 24-h period	1	Project: Assumption = continuous vibro-hammering for two 12 h shifts per day
Duration to drive a single pile (minutes)	1440	24 h = 1440 min
Transmission loss coefficient	15	NMFS suggested value (e-mail response from NOAA dated 13/11/2020)
Distance of sound pressure level (L _{rms}) measurement (meters)	14	Burgess (2005)



Table A6: Scenario 6 - Blackwell SPL_24 h

Input		Justification/Source
Weighting Factor Adjustment (kHz)	2.5	NMFS suggested value
Sound Pressure Level (L _{rms}), specified at "x" meters (Cell B30)	164	Blackwell (2005) – greatest mean SPL (rms)
Number of piles within 24-h period	1	Project: Assumption = continuous vibro-hammering for two 12 h shifts per day
Duration to drive a single pile (minutes)	1440	24 h = 1440 min
Transmission loss coefficient	15	NMFS suggested value (e-mail response from NOAA dated 13/11/2020)
Distance of sound pressure level (L _{rms}) measurement (meters)	56	Blackwell (2005)

Table A7: Scenario 7 - Graham SPL_24 h (considered to represent the WC scenario)

Input		Justification/Source
Weighting Factor Adjustment (kHz)	2.5	NMFS suggested value
Sound Pressure Level (L _{rms}), specified at "x" meters (Cell B30)	192	Graham <i>et al.</i> (2017) – rms source level
Number of piles within 24-h period	1	Project: Assumption = continuous vibro-hammering for two 12 h shifts per day
Duration to drive a single pile (minutes)	1440	24 h = 1440 min
Transmission loss coefficient	15	NMFS suggested value (e-mail response from NOAA dated 13/11/2020)
Distance of sound pressure level (L _{rms}) measurement (meters)	1	Graham <i>et al.</i> (2017) – source level assumed to be 1 m away from the source as per the definition provided in NOAA (2018; Appendix E Glossary)

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A.1: VIDratory Pile Drivin	IG (STATIONART S	OURCE: Non-III	ipuisive, co	nunuous)								
VERSION 2.1: 2020												
KEY												
	Action Proponent Provided In	formation										
	NMFS Provided Information (1	Fechnical Guidance)										
	Resultant Isopleth											
STER 1: CENERAL PROJECT INFORM	TION											
STEP 1: GENERAL PROJECT INFORMA	ation	1										
PROJECT TITLE	AQUIND											
PROJECT/SOURCE INFORMATION	Vibro-hammering work at the marine HDD exit Scenario 1											
Please include any assumptions												
· · ·												
PROJECT CONTACT												
STEP 2. WEIGHTING FACTOR ADJUST	MENT	Specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value										
STEL 2. HEIGHTING FACTOR ADJUST												
Weighting Factor Adjustment (kHz) [¥]	2.5	default value										
[#] Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternation	ve weighting/dB adjust	ment rather than relyin	g upon the WFA (so	ource-specific						
		However, they must provi	de additional suppor	t and documentation	supporting this m	odification.						
		, , ,										
STEP 3: SOURCE-SPECIFIC INFORMAT	FION											
Sound Pressure Level (<i>L</i> rms), specified at "x" meters (Cell B30)	155											
Number of piles within 24-h period	1											
Duration to drive a single pile (minutes)	720											
Duration of Sound Production within	43200											
10 Log (duration of sound production)	46.35		NOTE: The Liser Spr	andebeet tool providee	a means to estimat	ae dietancae aeeoo	bate					
Trenemiesies less spefficient	40.33		NOTE. The Oser Spic	ausneet toor provides	a means to estimate	es distances assoc	lateu					
Distance of sound pressure level	15		with the Technical Gu	idance's PTS onset thi	esholds. Mitigation	and monitoring						
(L _{rms}) measurement (meters)	14		requirements associa Endangered Species	ted with a Marine Mam Act (ESA) consultation	mal Protection Act or permit are indep	(MMPA) authorizati endent manageme	on or an nt					
			decisions made in the	context of the propose	ed activity and comp	prehensive effects a	inalysis,					
			and are beyond the s	cope of the Technical C	Guidance and the U	ser Spreadsheet to	ol.					
RESULTANT ISOPLETHS												
	Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid	Otariid Pinninede						
	SEL _{cum} Threshold	199	198	173	201	219						
	PIS isopleth to threshold (meters)	20.0	1.8	29.5	12.1	0.9						
WEIGHTING FUNCTION ON OUR TROP	6								ļ			
WEIGHTING FUNCTION CALCULATION												
	Weighting Function	Low-Frequency	Mid-Frequency	High-Frequency	Phoeid	Otariid						
	Parameters	Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds						
	a	1	1.6	1.8	1	2						
	b	2	2	2	2	2						
	f ₁	0.2	8.8	12	1.9	0.94						
	f ₂	19	110	140	30	25	NOTE: If user	decided to	override t	nese Adjus	ment value	es,
	С	0.13	1.2	1.36	0.75	0.64	they need to r	nake sure t	o downloa	d another c	ору	
	Adjustment (-dB)†	-0.05	-16.83	-23.50	-1.29	-0.60	to ensure the	built-in cal	culations f	unction pro	perly.	
ſ	$(f/f)^{2a}$											
$W(f) = C + 10\log_{10}\left\{\frac{1}{10000000000000000000000000000000000$	<u></u>											
$[1 + (f / f_1)]$	$\int [1 + (f / f_2)^2]^{\sigma}$											
L	L	l					1					

A.1: Vibratory Pile Drivin	ng (STATIONARY S	OURCE: Non-In	npulsive, Co	ntinuous)							
VERSION 2.1: 2020											
KEY											
	Action Proponent Provided In	formation									
	NMFS Provided Information (Resultant Isopleth	lechnical Guidance)									
STEP 1: GENERAL PROJECT INFORM	ATION										
		1									
PROJECT TITLE	AQUIND										
PROJECT/SOURCE INFORMATION	Vibro-hammering work at the marine HDD exit Scenario 2 (ML)										
Please include any assumptions											
PROJECT CONTACT											
STEP 2: WEIGHTING FACTOR ADJUST	MENT	Specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value									
Weighting Factor Adjustment (kHz) [¥]	2.5	default value									
⁴ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternativ	ve weighting/dB adjusti	nent rather than relying (dB) (row 48), and e	upon the WFA (sou	Irce-specific					
		However, they must provi	ide additional suppo	t and documentation	supporting this n	nodification.					
STEP 3: SOURCE-SPECIFIC INFORMA	TION										
Sound Pressure Level (L rms), specified at "x" meters (Cell B30)	155										
Number of piles within 24-h period	1										
Duration to drive a single pile (minutes) Duration of Sound Production within	1440										
24-h period (seconds)	86400										
10 Log (duration of sound production)	49.37		NOTE: The User Spre	eadsheet tool provides	a means to estimate	es distances associ	iated				
Transmission loss coefficient Distance of sound pressure level (L rms) measurement (meters)	15 14		with the Technical Gu	idance's PTS onset thr ted with a Marine Mam	esholds. Mitigation	and monitoring MMPA) authorizati	on or an				
			Endangered Species	Act (ESA) consultation	or permit are indep	endent manageme	nt				
			decisions made in the	context of the propose	ed activity and comp	rehensive effects a	inalysis,				
RESULTANT ISOPLETHS			and are beyond the s	Lope or the Technical G	purdance and the Us	ser opreadsneet to	JU.				
	Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds					
	SEL _{cum} Threshold	199	198	173	201	219					
	PTS Isopleth to threshold (meters)	31.7	2.8	46.8	19.3	1.4					
WEIGHTING FUNCTION CALCULATION	IS					, ,					
	Weighting Function	Low-Frequency	Mid-Erequency	High-Frequency	Phooid	Otariid					
	Parameters	Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds					
	а	1	1.6	1.8	1	2					
	b f.	2	2	2	2	2					
	f ₂	19	110	140	30	25	NOTE: If user	decided to	override t	hese Adjus	tment valu
	C	0.13	1.2	1.36	0.75	0.64	they need to r	nake sure f	to downloa	d another	сору
	Adjustment (-dB)†	-0.05	-16.83	-23.50	-1.29	-0.60	to ensure the	built-in cal	culations f	unction pro	operly.
1	(f(f)2a)										
$W(f) = C + 10\log_{10} \left\{ \frac{1}{10000000000000000000000000000000000$	2205 (0/0)224										
$[[1+(f/f_1)]]$	$\int [1 + (f/f_2)^*]^*$										
1		1	1		1	1	1	1	1	1	

A.1: Vibratory Pile Drivin	ng (STATIONARY S	OURCE: Non-Im	pulsive, Co	ntinuous)								
VERSION 2.1: 2020												
KEY												
	Action Proponent Provided In	formation				-						
	NMFS Provided Information (echnical Guidance)										
STEP 1: GENERAL PROJECT INFORMA	ATION											
PROJECT TITLE	AQUIND											
PROJECT/SOURCE INFORMATION	Vibro-hammering work at the marine HDD exit Scenario 3											
Please include any assumptions												
PROJECT CONTACT												
STEP 2: WEIGHTING FACTOR ADJUST	MENT	Specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value										
Weighting Factor Adjustment (kHz) [¥]	2.5	default value										
⁴ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternativ	re weighting/dB adjust	ment rather than relyin	g upon the WFA (so	urce-specific						
		However, they must provi	de additional suppor	t and documentation	supporting this m	odification.						
						-						
STEP 3: SOURCE-SPECIFIC INFORMAT	TION											
Sound Pressure Level (L rms), specified at "x" meters (Cell B30)	152											
Number of piles within 24-h period	1											
Duration to drive a single pile (minutes)	720											
24-h period (seconds)	43200											
10 Log (duration of sound production)	46.35		NOTE: The User Spr	eadsheet tool provides	a means to estimat	es distances assoc	iated					
Transmission loss coefficient	15		with the Technical Gu	idance's PTS onset the	resholds. Mitigation	and monitoring						
(L rms) measurement (meters)	5		requirements associa	ted with a Marine Mam	mal Protection Act	MMPA) authorizati	on or an					
			decisions made in the	context of the propose	ed activity and comp	rehensive effects a	inalysis,					
			and are beyond the s	cope of the Technical C	Guidance and the U	ser Spreadsheet to	ol.					
RESULTANT ISOPLETHS	Hearing Group	Low-Frequency	Mid-Frequency	High-Frequency	Phocid	Otariid						
	SEI Threehold	Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds						
		199	198	173	201	219						
	(meters)	4.5	0.4	6.6	2.7	0.2						
WEIGHTING FUNCTION CALCULATION	IS											
	Weighting Function	Low-Frequency	Mid-Frequency	High-Frequency	Phocid	Otariid						
	Parameters	Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds						
	b	2	2	2	2	2						
	f ₁	0.2	8.8	12	1.9	0.94						
	f ₂	19	110	140	30	25	NOTE: If user	decided to	override t	hese Adjus	tment value	es,
	C Adjustment (.dP)+	0.13	1.2	1.36	0.75	0.64	they need to r	nake sure t	o downloa	a another c	opy	
	ragaotinent (*0D)	-0.00	-10.00	-23.00	-1.23	-0.00		in car				
	$(f/f_1)^{2a}$											
$W(f) = C + 10\log_{10}\left\{\frac{1}{\left[1 + (f/f)\right]}\right\}$	$)^{2}]^{a} [1 + (f/f_{c})^{2}]^{b}$											
((*****) /)1	/11-10-02/1											
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A.1: Vibratory Pile Drivin	g (STATIONARY S	OURCE: Non-Im	pulsive, Co	ntinuous)								
VERSION 2.1: 2020				· · · ·								
KEY												
	Action Proponent Provided In	formation										
	NMFS Provided Information (1	fechnical Guidance)										
	Resultant Isopleth											
STEP 1: GENERAL PROJECT INFORMA	TION											
PROJECT TITLE	AQUIND											
PROJECT/SOURCE INFORMATION	Vibro-hammering work at the marine HDD exit Scenario 4											
Please include any assumptions												
PROJECT CONTACT												
		Specify if relying on source- specific WFA, alternative										
STEP 2: WEIGHTING FACTOR ADJUST	MENT	weighting/dB adjustment, or if using default value										
Weighting Factor Adjustment (kHz) [¥]	2.5	default value										
* Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz): For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternativ or default), they may over	ve weighting/dB adjust ride the Adjustment	ment rather than relyin (dB) (row 48), and ei	g upon the WFA (so nter the new value	ource-specific						
		However, they must provi	de additional suppor	t and documentation	supporting this m	odification.						
STEP 3: SOURCE-SPECIFIC INFORMAT	TION											
Sound Pressure Level (<i>L</i> _{rms}), specified at "x" meters (Cell B30)	152											
Number of piles within 24-h period	1											
Duration to drive a single pile (minutes)	1440											
24-h period (seconds)	86400											
10 Log (duration of sound production)	49.37		NOTE: The User Spre	eadsheet tool provides	a means to estimate	es distances assoc	iated					
Transmission loss coefficient	15		with the Technical Gu	idance's PTS onset the	esholds. Mitigation	and monitoring						
Distance of sound pressure level (L _{rms}) measurement (meters)	5		requirements associa Endangered Species	ted with a Marine Mam Act (ESA) consultation	mal Protection Act (or permit are indep	(MMPA) authorizati endent manageme	on or an nt					
			decisions made in the	context of the propose	ed activity and comp Suidance and the Us	prenensive effects a ser Spreadsheet to	analysis, ol					
RESULTANT ISOPLETHS			and are beyond all Si		- samos and and Ut							
	Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds						
	SEL _{cum} Threshold	199	198	173	201	219						
	(meters)	7.1	0.6	10.6	4.3	0.3						
WEIGHTING FUNCTION CALCULATION	s											
	Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds						
	a	1	1.6	1.8	1	2						
	0 f.	0.2	8.8	12	19	0.94						
	f ₂	19	110	140	30	25	NOTE: If user	decided to	override t	nese Adjus	ment value	es,
	c	0.13	1.2	1.36	0.75	0.64	they need to r	nake sure t	o downloa	d another c	ору	,
	Adjustment (-dB)†	-0.05	-16.83	-23.50	-1.29	-0.60	to ensure the	built-in cal	culations f	unction pro	perly.	
$W(f) = C + 10 \log_{10}$	$(f/f_1)^{2a}$											
$[1+(f/f_1)]$	$[1^{2}]^{a}[1+(f/f_{2})^{2}]^{b}]$											
L	1	1					1	I	I	I		I

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KEY												
	Action Proponent Provided In	formation										
	NMFS Provided Information (1	echnical Guidance)										
	Resultant Isopleth	,										
STEP 1: GENERAL PROJECT INFORMA	TION											
PROJECT TITLE	AQUIND											
PROJECT/SOURCE INFORMATION	Vibro-hammering work at the marine HDD exit Scenario 5											
Please include any assumptions												
PROJECT CONTACT												
		Specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value										
Weighting Factor Adjustment (kHz) [¥]	2.5	default value										
⁴ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternativ or default), they may over										
		However, they must provi	de additional suppor	t and documentation	supporting this m	odification.						
STEP 3: SOURCE-SPECIFIC INFORMAT	TION											
Sound Pressure Level (<i>L</i> _{rms}), specified at "x" meters (Cell B30)	161											
Number of piles within 24-h period	1											
Duration to drive a single pile (minutes)	1440											
24-h period (seconds)	86400											
10 Log (duration of sound production)	49.37		NOTE: The User Spre	adsheet tool provides	a means to estimate	es distances assoc	iated					
Transmission loss coefficient	15		with the Technical Gu	idance's PTS onset thr	esholds. Mitigation	and monitoring						
Distance of sound pressure level (L _{rms}) measurement (meters)	14		requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endancered Structics Act (FSA) consultation or permit are independent monocomposi-									
			decisions made in the	context of the propose	ed activity and comp	orehensive effects a	inalysis,					
			and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.									
RESULTANT ISOPLETHS			Mid Freewanny High Freewanny Directed Constitut									
	Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Pinnipeds						
	SEL _{cum} Threshold	199	198	173	201	219						
	(meters)	79.6	7.1	117.6	48.4	3.4						
WEIGHTING FUNCTION CALCULATION	IS											
	Weighting Function	Low-Frequency	Mid-Frequency	High-Frequency	Phoeid	Otariid						
	Parameters	Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds						
	а	1	1.6	1.8	1	2						
	b	2	2	2	2	2						
	f ₁	0.2	8.8	12	1.9	0.94	NOTE: Y	ala alat - 1 C				
	f ₂	19	110	140	30	25	they need to r	uecided to	override t	iese Adjust	ment value	ss,
	Adjustment (-dR)+	-0.05	-16.83	-23 50	-1.29	-0.60	to ensure the	built-in cal	culations f	unction pro	perly.	
	,	0.00	10.00	20.00		0.00						
l l	$(f/f_{1})^{2a}$											
$W(f) = C + 10 \log_{10} \left\{ \frac{1}{10 + 10 + 10} \right\}$	219[1 + (f / f)210											
$(\mu + (J / J_1))$	$J_{1} [1 + (J / J_{2})]$											

A.1: Vibratory Pile Drivin	ng (STATIONARY S	OURCE: Non-Im	npulsive, Co	ntinuous)								
VERSION 2.1: 2020								1	1			
KEY												
	Action Proponent Provided In	formation										
	NMFS Provided Information (1	Fechnical Guidance)										
	Resultant isopleth											
STEP 1: GENERAL PROJECT INFORMA	ATION											
PROJECT TITLE	AQUIND											
PROJECT/SOURCE INFORMATION	Vibro-hammering work at the marine HDD exit Scenario 6											
Please include any assumptions												
PROJECT CONTACT												
STEP 2: WEIGHTING FACTOR ADJUSTMENT		Specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value										
Weighting Factor Adjustment (kHz) [¥]	2.5	default value										
⁴ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternation										
		However, they must provi	de additional suppor	t and documentation	supporting this m	odification.						
STEP 3: SOURCE-SPECIFIC INFORMAT	TION											
Sound Pressure Level (<i>L</i> _{rms}), specified at "x" meters (Cell B30)	164											
Number of piles within 24-h period	1											
Duration to drive a single pile (minutes)	1440											
24-h period (seconds)	86400											
10 Log (duration of sound production)	49.37		NOTE: The User Spre	eadsheet tool provides	a means to estimate	es distances assoc	iated					
Transmission loss coefficient	15	with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring										
(L _{rms}) measurement (meters)	56	requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an										
			decisions made in the context of the proposed activity and comprehensive effects analysis,									
			and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.									
RESULTANT ISOPLETHS	Hearing Group	Low-Frequency	Mid-Frequency	High-Frequency	Phocid	Otariid						
	SEL _{cum} Threshold	199	198	173	201	219						
	PTS isopleth to threshold (meters)	504.4	44.7	745.7	306.6	21.5						
WEIGHTING FUNCTION CALCULATION	IS											
	Weighting Eurotics	Low Fraguance	Mid Fraguer av	High Frequer	Phonid	Otoriid						
	Parameters	Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds						
	а	1	1.6	1.8	1	2						
	b f.	2	2	2	2	2						
	f ₂	19	110	140	30	25	NOTE: If user	decided to	override ti	nese Adjus	tment value	es,
	С	0.13	1.2	1.36	0.75	0.64	they need to r	nake sure t	o downloa	d another o	ору	
	Adjustment (-dB)†	-0.05	-16.83	-23.50	-1.29	-0.60	to ensure the	built-in cal	culations f	unction pro	perly.	
ſ	(616)20											
$W(f) = C + 10\log_{10}$	(J / J ₁)**											
$[1+(f/f_1)]$	$\int [1 + (f/f_2)^2]^{o}$											

A 1. Vibratory Pile Drivin	a (STATIONARY S		nulsiva Co	ntinuous)								
VERSION 2.1: 2020				litilitaoao,								
KEY												
	Action Proponent Provided In	formation										
	NMFS Provided Information (1	echnical Guidance)										
	Resultant Isopleth											
STER 1: GENERAL PROJECT INFORM												
STEP 1: GENERAL PROJECT INFORMA												
PROJECT TITLE	AQUIND											
PROJECT/SOURCE INFORMATION	Vibro-hammering work at the marine HDD exit Scenario 7 (WC)											
Please include any assumptions												
PROJECT CONTACT												
		Specify if relying on source- specific WFA, alternative weighting/dB adjustment, or if using default value										
		3										
Weighting Factor Adjustment (kHz) [¥]	2.5	default value										
⁴ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab		† If a user relies on alternation or default), they may over										
		However, they must provi	de additional suppor	t and documentation	supporting this m	odification.						
STEP 3: SOURCE-SPECIFIC INFORMAT	TION											
Sound Pressure Level (<i>L</i> _{rms}), specified at "x" meters (Cell B30)	192											
Number of piles within 24-h period	1											
Duration to drive a single pile (minutes)	1440											
Duration of Sound Production within 24-h period (seconds)	86400											
10 Log (duration of sound production)	49.37		NOTE: The User Spre	adsheet tool provides	a means to estimate	es distances assoc	iated					
Transmission loss coefficient	15		with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring									
Distance of sound pressure level (L _{rms}) measurement (meters)	1		requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an									
			decisions made in the context of the proposed activity and comprehensive effects analysis,									
			and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.									
RESULTANT ISOPLETHS		Lew Free more and	Mid Freemanny - Mich Freemanny - Dhavid Otavid									
	Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Pinnipeds						
	SEL _{cum} Threshold	199	198	173	201	219						
	(meters)	662.6	58.7	979.6	402.7	28.3						
WEIGHTING FUNCTION CALCULATION	IS											
	Weighting Eurotion	Low-Erectionov	Mid-Erequence:	High-Frequency	Phonid	Otoriid	ł					
	Parameters	Cetaceans	Cetaceans	Cetaceans	Pinnipeds	Pinnipeds						
	а	1	1.6	1.8	1	2						
	b	2	2	2	2	2					-	
	f ₁	0.2	8.8	12	1.9	0.94						
	f ₂	19	110	140	30	25	NOTE: If user	decided to	override t	nese Adjus	ment value	es,
	C	0.13	1.2	1.36	0.75	0.64	they need to r	nake sure t	o downloa	d another c	opy	
	Adjustment (-dB)†	-0.05	-16.83	-23.50	-1.29	-0.60	to ensure the	puilt-in cal	culations f	unction pro	perly.	
ſ	(616)20											
$W(f) = C + 10 \log_{10}$	(<i>J</i> / <i>J</i> ₁)**											
$ [1+(f/f_1)] $	$^{2}]^{a}[1+(f/f_{2})^{2}]^{b}]$											
(- 3 H												
	I	1	1	1			1					