

Viking CCS Pipeline

**Environmental
Statement Volume IV –
Appendix 13-2:
Construction Noise
Calculations**

Document Reference: EN070008/APP/6.4.13.2

Applicant: Chrysaor Production (U.K.) Limited,
a Harbour Energy Company
PINS Reference: EN070008
Planning Act 2008 (as amended)
The Infrastructure Planning (Applications: Prescribed Forms
and Procedure) Regulations 2009 - Regulation 5(2)(a)
Date: October 2023

PINS Reference	Document Reference	Document Revision	Date
EN070008	EN070008/APP/6.4.13.2	Revision 1	October 2023

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1 Construction Noise Calculations

1.1 Overview

1.1.1 This appendix of the Environment Statement presents the activities and noise data used in construction noise calculations. CadnaA noise mapping software was used to predict construction noise levels at the selected receptors. The construction noise model followed the procedures for prediction of demolition and construction noise set out in BS 5228-1. The assessment of noise covers the following construction activities:

- Pipeline Construction:
 - Creation of access tracks;
 - Topsoil stripping;
 - Pipe stringing, bending and welding;
 - Excavation of pipe trench including entry and reception pits using mechanical excavators or specialised trenching machine;
 - Placement of welded pipe using boom cranes;
 - Dewatering of the trench and other excavations; and
 - Reinstatement.
- Pipeline Crossing:
 - Horizontal directional drilling;
 - Auger crossing;
 - Micro tunnelling; and
 - Open-cut crossing.

1.2 BS5228 Pipeline Construction Noise Calculations

1.2.1 **Table 1** to **Table 7** present the plant and vehicle noise data used to calculate pipeline construction noise for the different phases of construction. Activities during each phase of construction were provided by The Applicant and this was paired with plant noise data found in BS 5228:2014+A1:2019 'Code of practice for noise and vibration control on construction and open sites'.

1.2.2 The Applicant provided details on items of plant and quantity but operating times have been assumed based on past experience and previous assessments.

Table 1: Creation of Access Tracks

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, L_{Aeq} , dB at 10 m	Quantity	Ave sound power level, L_{WA} [$=L_{Aeq} + 28$ dB(A)]	Operating Time
Excavator Cat 320	BS5228-1: Table C.2, Item 18	Tracked excavator	75	2	103	8
44t Artic Truck (Flatbed)	BS5228-1: Table C.2, Item 33	Articulated dump truck (empty)	81	1	109	4
8x2 Rigid Truck with HIAB	BS5228-1: Table C.4, Item 43	Wheeled mobile crane	70	1	98	4
10t Dump Truck	BS5228-1: Table C.4, Item 2	Articulated dump truck	78	1	106	4
3.5t Mini Digger	BS5228-1: Table C.4, Item 67	Mini tracked excavator	74	1	102	8
Excavator Cat 330	BS5228-1: Table C.2, Item 15	Tracked excavator	76	2	104	8
D7 Bulldozer	BS5228-1: Table C.5, Item 12	Dozer	77	2	105	4
Cat 14G Grader	BS5228-1: Table C.6, Item 31	Grader	86	2	114	2
Cat CB10 Tandem Vibratory Roller	BS5228-1: Table C.5, Item 21	Vibratory roller	80	1	108	4
20t Tipper Truck	BS5228-1: Table C.8, Item 15	Articulated dump truck	79	2	107	4

Table 2: Topsoil Stripping

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
Excavator Cat 320	BS5228-1: Table C.2, Item 18	Tracked excavator	75	2	103	8
D7 Bulldozer	BS5228-1: Table C.5, Item 12	Dozer	77	2	105	4
Cat 14G Grader	BS5228-1: Table C.6, Item 31	Grader	86	1	114	2

Table 3: Pipe Stringing, Bending and Welding

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
100 kVA Induction Generator	BS5228-1: Table C.6, Item 39	Diesel generator	65	1	93	6
Tractor and Trailer with HIAB	BS5228-1: Table C.4, Item 75	Tractor (towing trailer)	79	1	107	4
100 kVA Induction Generator	BS5228-1: Table C.6, Item 39	Diesel generator	65	1	93	6
45t Excavator with 10t Vacuum Lift-Vacuwork	BS5228-1: Table C.2, Item 14	Tracked excavator	79	1	107	8
50 ton Crane	BS5228-1: Table C.4, Item 46	Mobile telescopic crane	67	2	95	8

Table 4: Excavation of pipe trench using mechanical excavators or specialised trenching machine

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
Excavator Cat 330	BS5228-1: Table C.2, Item 15	Tracked excavator	76	4	104	8
D6 Bulldozer	BS5228-1: Table C.5, Item 15	Bulldozer	83	1	111	4

Table 5: Placement of welded pipe using boom cranes

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
Excavator Cat 330	BS5228-1: Table C.2, Item 15	Tracked excavator	76	2	104	8
8x2 Rigid Truck with HIAB	BS5228-1: Table C.4, Item 43	Wheeled mobile crane	70	1	98	4
583 Sideboom	BS5228-1: Table C.4, Item 53	Lorry with lifting boom	77	6	105	4

Table 6: Dewatering of the trench and other excavations

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
Excavator Cat 320	BS5228-1: Table C.2, Item 18	Tracked excavator	75	2	103	8
D7 Bulldozer	BS5228-1: Table C.5, Item 12	Dozer	77	1	105	4
Cat 14G Grader	BS5228-1: Table C.6, Item 31	Grader	86	1	114	2
Roller - Bomag Single Drum	BS5228-1: Table C.5, Item 26	Vibratory roller	77	2	105	4

Table 7: Reinstatement

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
Excavator Cat 330	BS5228-1: Table C.2, Item 15	Tracked excavator	76	3	104	8
D7 Bulldozer	BS5228-1: Table C.5, Item 12	Dozer	77	2	105	4
10t Dumper Truck	BS5228-1: Table C.4, Item 4	Dumper	76	2	104	4
Cat 14G Grader	BS5228-1: Table C.6, Item 31	Grader	86	1	114	2
8x2 Rigid Truck with HIAB	BS5228-1: Table C.4, Item 43	Wheeled mobile crane	70	1	98	4
Excavator Cat 320	BS5228-1: Table C.2, Item 18	Tracked excavator	75	2	103	8
Kubota Tractor with 3 Point Post Hole Borer	BS5228-1: Table C.4, Item 74	Tractor (towing equipment)	80	1	108	4

1.3 BS5228 Pipeline Crossing Construction Noise Calculations

1.3.1 **Table 8** to **Table 11** present the plant and vehicle noise data used to calculate pipeline crossing construction noise for the different methods of pipeline crossing. Activities during each method of crossing were provided by the client and this was paired with noise data found in BS 5228:2014+A1:2019 'Code of practice for noise and vibration control on construction and open sites'.

Table 8: Horizontal Directional Drilling

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
400kVa Generator	BS5228-1: Table C.4, Item 96	Directional drill (generator)	77	2	105	12
500kVa Generator	BS5228-1: Table C.4, Item 96	Directional drill (generator)	77	2	105	12
110kVa Generator	BS5228-1: Table C.6, Item 39	Diesel generator	65	2	93	12
Excavator Cat 320	BS5228-1: Table C.2, Item 18	Tracked excavator	75	4	103	4
HDD Rig	BS5228-1: Table C.5, Item 22	Mounting supports for directional drill (hydraulic hammer)	87	2	115	4
50t All Terrain Mobile Crane	BS5228-1: Table C.3, Item 29	Tracked mobile crane	70	2	98	6
44t Artic Truck (Flatbed)	BS5228-1: Table C.4, Item 4	Articulated dump truck (empty)	76	4	104	4
8x2 Rigid Truck with HIAB	BS5228-1: Table C.4, Item 43	Wheeled mobile crane	70	2	98	4

Table 9: Auger Crossing

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
400kVa Generator	BS5228-1: Table C.4, Item 96	Directional drill (generator)	77	2	105	12
500kVa Generator	BS5228-1: Table C.4, Item 96	Directional drill (generator)	77	2	105	12
110kVa Generator	BS5228-1: Table C.6, Item 39	Diesel generator	65	2	93	12

Table 10: Micro Tunnelling

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
400kVa Generator	BS5228-1: Table C.4, Item 96	Directional drill (generator)	77	2	105	12
500kVa Generator	BS5228-1: Table C.4, Item 96	Directional drill (generator)	77	2	105	12
110kVa Generator	BS5228-1: Table C.6, Item 39	Diesel generator	65	2	93	12

Table 11: Open-cut Crossing

Client Description	BS5228 Reference	Description	A-weighted sound pressure level, LAeq, dB at 10 m	Quantity	Ave sound power level, LWA [=LAeq +28 bB(A)]	Operating Time
400kVa Generator	BS5228-1: Table C.4, Item 96	Directional drill (generator)	77	2	105	12
500kVa Generator	BS5228-1: Table C.4, Item 96	Directional drill (generator)	77	2	105	12

1.4 Construction Noise Assessment Distance Summary

- 1.4.1 Using the plant data for each identified construction assessment scenario, the distances at which the Lowest Observed Adverse Effect Level (LOAEL) and the Significant Observed Adverse Effect Level (SOEAL) would occur were calculated. The LOAEL and SOAEL for construction noise are defined in **Table 13-11** of *ES Volume II Chapter 13: Noise and Vibration (Application Document 6.2.13)*. **Table 12** and **Table 13** presents a summary of the calculated ranges of distances from each specified construction activity. As HDD activities are likely to be continuous and may extend into the night-time period, the SOAEL for potential noise emissions at night has been identified.
- 1.4.2 A sound pressure level at 10m has been calculated for each item of plant and logarithmically summed taking into consideration the percentage of time, and quantity of plant. Soft ground has been assumed at all locations. A distance calculation was then used to find the equivalent sound level required to reach the LOAEL and SOAEL from the site boundary as shown in **Table 12** and **Table 13**.

Table 12: Summary of Pipeline Construction Activity Distance for LOAEL and SOAEL

Construction Works Phase	Worst Case Activity	Distance from construction site boundary (m)	
		Daytime LOAEL	Daytime SOAEL
RoW Preparation works	Creation of access tracks	90	35
	Topsoil Stripping	60	20
	Reinstatement	75	30
Pipe stringing	Pipeline stringing, bending, welding	50	20
Trench excavation, pipe lower, and lay	Excavation of Pipe Trench	65	25
	Placement of welded pipe	60	20
Pre/post drainage	Dewatering the trench	60	25

Table 13: Summary of Pipeline Crossing Construction Activity Distance for LOAEL and SOAEL

Construction Phase	works	Distance from construction site boundary (m)		
		Daytime LOAEL	Daytime SOAEL	Night-time SOAEL
HDD		110	45	280
Auger		70	30	-
Open-cut crossing		60	25	-
Micro Tunnel		65	25	-

