



TECHNICAL NOTE 1

DATE:	04 December 2024	CONFIDENTIALITY:	Public
SUBJECT:	Noise Impact Assessment Report		
PROJECT:	Kincardine Tower XD130 Foundations and Access Bridge	AUTHOR:	Stephanie Schull
CHECKED:	Hannah Jones	APPROVED:	Hannah Jones

INTRODUCTION

Kincardine Tower XD130 and access bridge are located in the Firth of Forth adjacent to the Kincardine Substation and Clackmannanshire Bridge, in Fife. Significant levels of deterioration to the concrete foundations and access structures of Tower XD130 have been recorded, and remedial works are therefore required to maintain the serviceability of the towers.

It is understood that following remedial works will include:

- The areas of spalled and delaminated concrete be removed, and the areas repaired including supplementing corroded rebar as appropriate.
- Sacrificial galvanic cathodic protection be installed within the repairs to extend their life within this extreme environment and reduce the risk of anodic reactions.
- Existing handrail to be replaced with a solid section galvanized steel pedestrian guard rail with vertical rails (group P4 parapet) to BS 7818.
- The structure will be inspected in accordance with the DMRB guidance (CS450) with a series of General and Principal Inspections and any further maintenance identified carried out.

The remedial works have the potential to cause disturbance to the terrestrial ecological receptors of the Firth of Forth Special Protect Area (SPA) and Ramsar. WSP UK Ltd has been commissioned to undertake a baseline noise survey and construction noise modelling to support the Habitats Regulations Assessment(HRA) for the remedial works.

BASELINE ENVIRONMENT

Overview

Based on information provided by Bowdens Ecology, the Project Ecologists, short-term attended noise measurements were undertaken at two locations considered to be representative of the terrestrial ecological receptors of the Firth of Forth SPA and Ramsar. The attended measurements were carried out between 10:00 and 16:00 hours on Tuesday 4 November 2024.

During the survey, there was no rain, cloud cover was 30%, the temperature was around 8 °C and wind speed was < 5 m/s.

Measurement positions

The sound level meter was positioned on a tripod at a height of 1.5 m, in free-field conditions at the following positions:

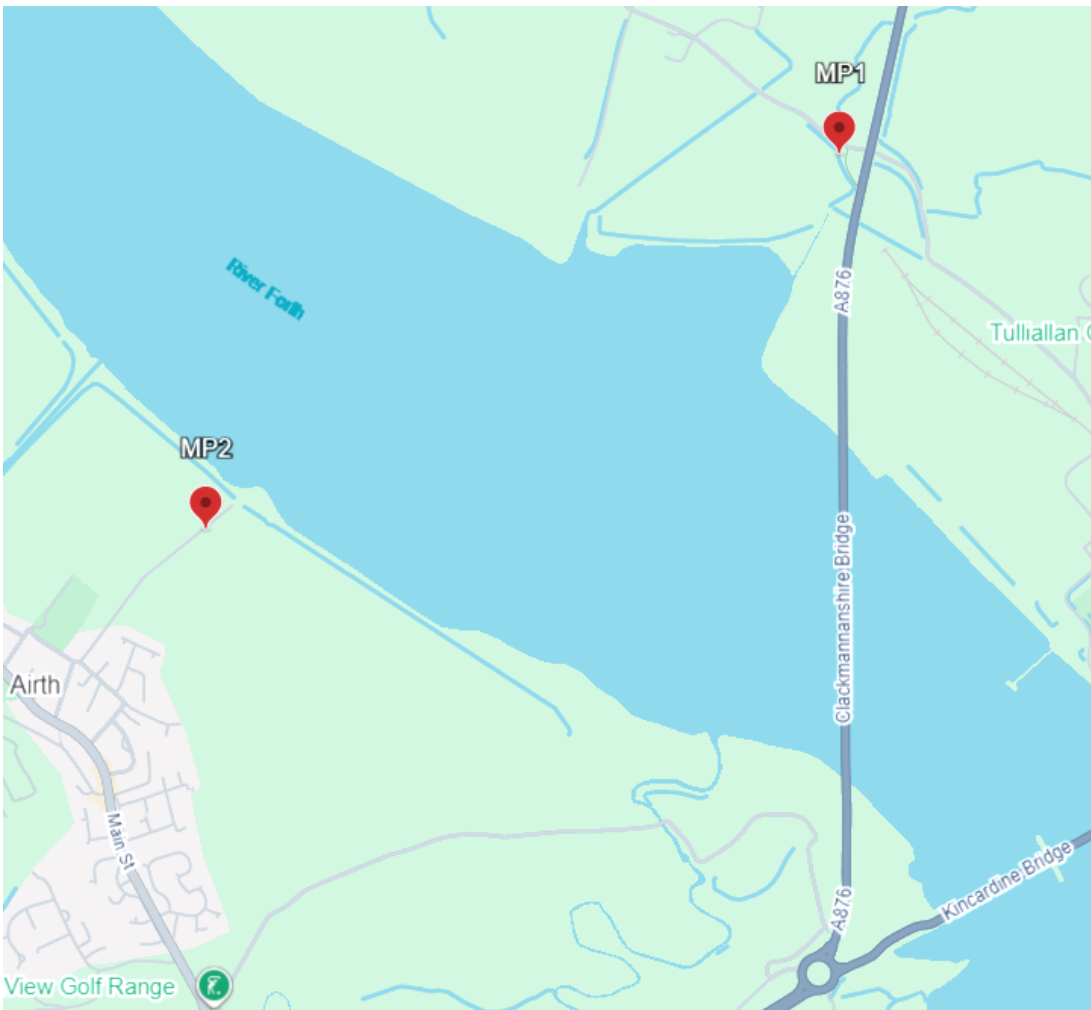
- Measurement Position 1 (MP1): Situated to the north of Clackmanannshire bridge and approximately 50 m to the west of the A876. The dominant noise was road traffic from the A876, with occasional pass-bys on the overpass.
- Measurement Position 2 (MP2): Situated to the north of Airth on Shore Road, approximately 120 m from River Forth. The dominant noise was distant traffic from the A876 and birds noise.

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Figure 1 shows the location of the attended measurement positions.

Figure 1: Locations of noise monitoring positions



Equipment Details

The sound measurement equipment used to undertake the attended measurements is summarised in Table 1. The sound level meters were subject to field calibration tests prior and on completion of each set of measurements using the calibrator identified below. No significant drift occurred (< 0.1 dB).



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Table 1: Equipment details

Equipment Description	Manufacturer & Type No.	Serial No.	Calibration Due Date
Sound Level Meter	01dB-Metravib Fusion Sound Level Meter	10797	11 October 2025
Pre-amplifier	01dB PRE22 Preamplifier	10870	
Microphone	GRAS Type 40CD Condenser Microphone	207593	
Calibrator	Rion NC-74 Sound Calibrator	34251554	08 July 2025

All routine equipment performance calibrations are performed by a UKAS accredited laboratory to traceable national and international standards.

Measurement Results

Table 2 and 3 below summarise the sound level measurement results from the survey.

Table 2: Short-term measurement summary at MP1

Measurement Period	dB L _{Aeq,15mins}	dB L _{AFmax,15mins}	dB L _{A90,15mins}
10:18	62	85	55
10:33	61	77	55
10:48	59	71	53
11:03	60	76	54
11:18	56	60	50
12:55	59	71	54
13:10	60	79	53
13:25	59	73	54
13:40	59	78	52



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Measurement Period	dB LAeq,15mins	dB LAFmax,15mins	dB LA90,15mins
13:55	60	78	53
14:10	60	72	54
14:25	59	59	59
Range	56 - 62	59 – 85	50 – 59
Logarithmic Average	60	-	-

Table 3: Short-term measurement summary at MP2

Measurement Period	dB LAeq,15mins	dB LAFmax,15mins	dB LA90,15mins
11:35	38	55	36
11:50	38	59	36
12:05	39	52	35
12:20	39	64	34
12:35	43	45	40
14:50	38	50	35
15:05	38	50	35
15:20	39	48	37
15:35	42	54	40
15:50	47	50	41

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Measurement Period	dB LAeq,15mins	dB LAFmax,15mins	dB LA90,15mins
Range	38 – 47	45 – 64	34 – 41
Logarithmic Average	41	-	-

CONSTRUCTION NOISE MODELLING

Overview

Construction noise modelling has been undertaken to determine the likely noise levels arising from the proposed remedial works at representative areas within the Firth of Forth SPA and Ramsar. The noise modelling has been carried out in accordance with the guidance in BS 5228-1¹.

BS 5228-1 provides guidance on appropriate methods for minimising noise from construction activities. Techniques for predicting the likely noise effects from construction works are given, these are based on detailed information of the type and number of plant items being used, their location and the length of time they are in operation. Noise prediction methods are used to establish likely noise levels in terms of the LAeq,T over the core working day.

Proposed Plant, Noise Levels and Programmes

To inform this assessment, it has been necessary to make assumptions regarding the plant likely to be used, their number and 'on-time' (i.e. the percentage of time in operation). These assumptions are summarised in Table 4 and have been based on noise measurements of hydro-demolition works as set out in the noise report prepared by Environmental Measurements dated March 2020². It is understood that these works are considered to be worst-case in terms of the noise levels likely to be generated by the proposed remedial works.

¹ British Standard 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise' (BSI, 2014)

² Report Noise, For John Sisk & Son, HyrdoDemolition, Dunkettle, Co.Cork dated 5 March 2020.

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Table 4: Indicative plant for the Remedial Works

Works	No. of Plant	Percentage 'on-time'	Source Sound Pressure Level @ 1 m dB L _{Aeq,T}	Overall corrected Sound Power Level (dB)
Hydro-demolition	1	100%	106	114

In practice, the works will move around the towers and operate at different locations for different durations. As such, noise levels at any receptor may vary day-on-day. Hence, it is necessary to rationalise the geographic location of the works.

The most important assumptions relate to the location of construction plant and their operational 'on-time' during the period of interest. With respect to the geographical location of the remedial works, it has been assumed that the works will operate at a single point in the central area of the nearest tower. The plant is assumed to operate 100% of the time.

The working hours for the remedial works are currently anticipated to be between 07:00 to 17:00 Monday to Friday with no working on Saturdays and Sundays.

Other assumptions which have been made with respect to the construction noise predictions are:

- no barriers have been included;
- topographical data has been sourced from <https://earthexplorer.usgs.gov/>;
- acoustically reflective ground cover has been assumed for the Firth of Forth river;
- with the exception of the Firth of Forth river, acoustically soft ground cover has been assumed between the noise source and receptor;
- no atmospheric absorption has been included;
- the source position has been taken at 5 m above sea level;
- the receptor positions have both been taken at 1.5 m above local ground; and
- meteorological conditions, such as wind speed and direction, have been taken to be 'neutral' i.e. would not influence the construction noise levels at the receptor.

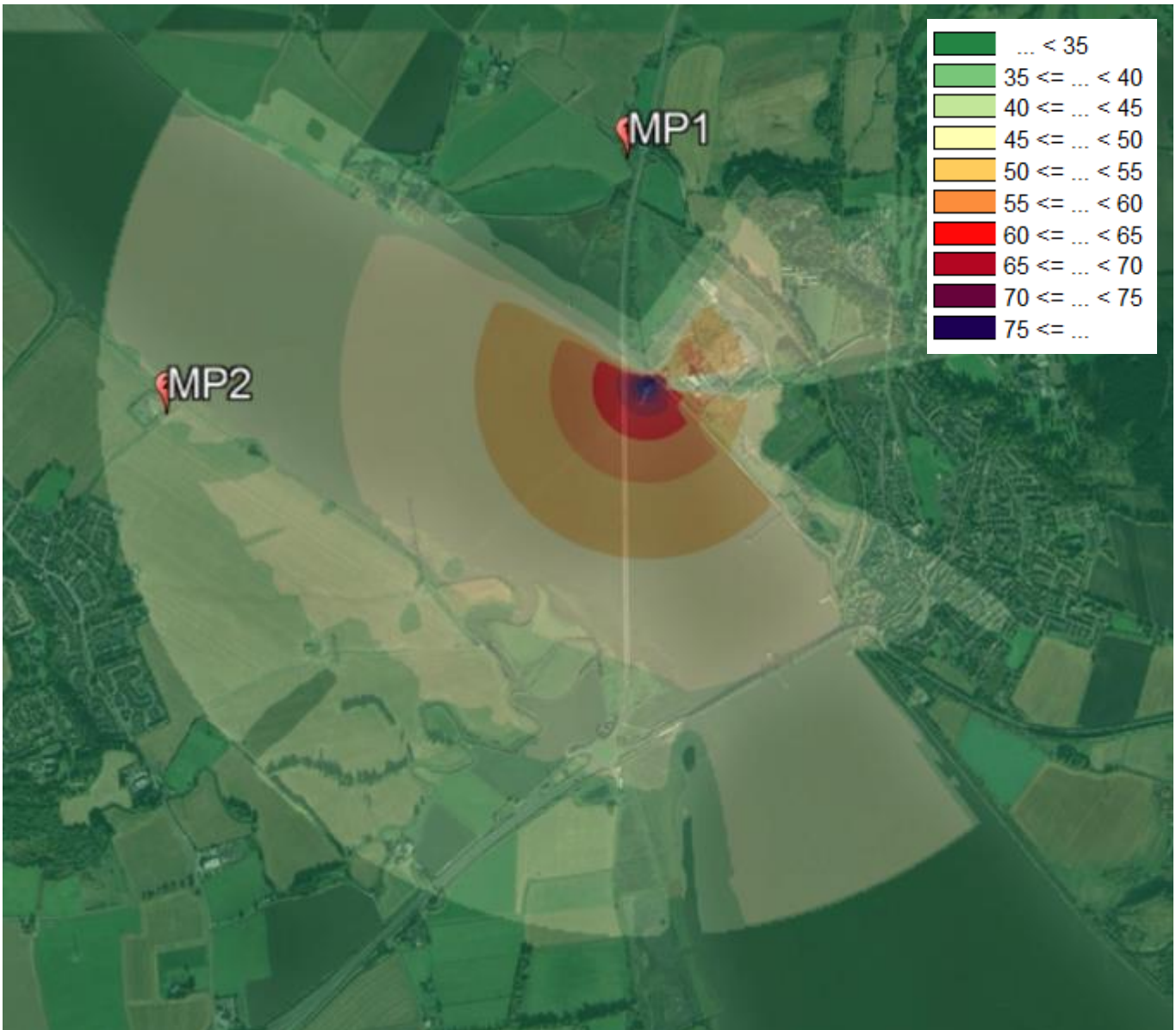
Appraisal

Figure 2 presents the noise levels associated with the worst-case remedial activities of hydro-demolition at representative areas within the First of Forth SPA and Ramsar.

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Figure 2: Predicted noise levels for the proposed remedial works of the Kincardine Tower XD130



As seen in Figure 2, at a distance of approximately 350 m, the predicted noise levels for the typical construction activities associated with the proposed works at the representative ecological areas fall below 55 dB, $L_{Aeq,T}$.

Table 5 presents the noise levels associated with the proposed remedial works at the measurement positions.

Table 4: Predicted construction noise levels at measurement locations



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Measurement Position	Sound pressure level dB LAeq
MP1	25
MP2	41